Troubleshooting Guide

for

DSD-201 & DSD-91e

ALCOHOL
CAUTION
Remove Drain Hose Prior to Removing Reservoir Tank
CAUTION
Remove Drain Hose Prior to Removing Reservoir Tank

This document is intended as a guide only and does not constitute a definitive explanation of every problem that may occur on the DSD series Automatic Endoscope Reprocessors (AER).

CAUTION	Maintenance and advanced troubleshooting must be performed by qualified individuals.

WARNING:	Line voltage is present in the DSD, never disconnect, connect components or circuit bds with power applied to the DSD.

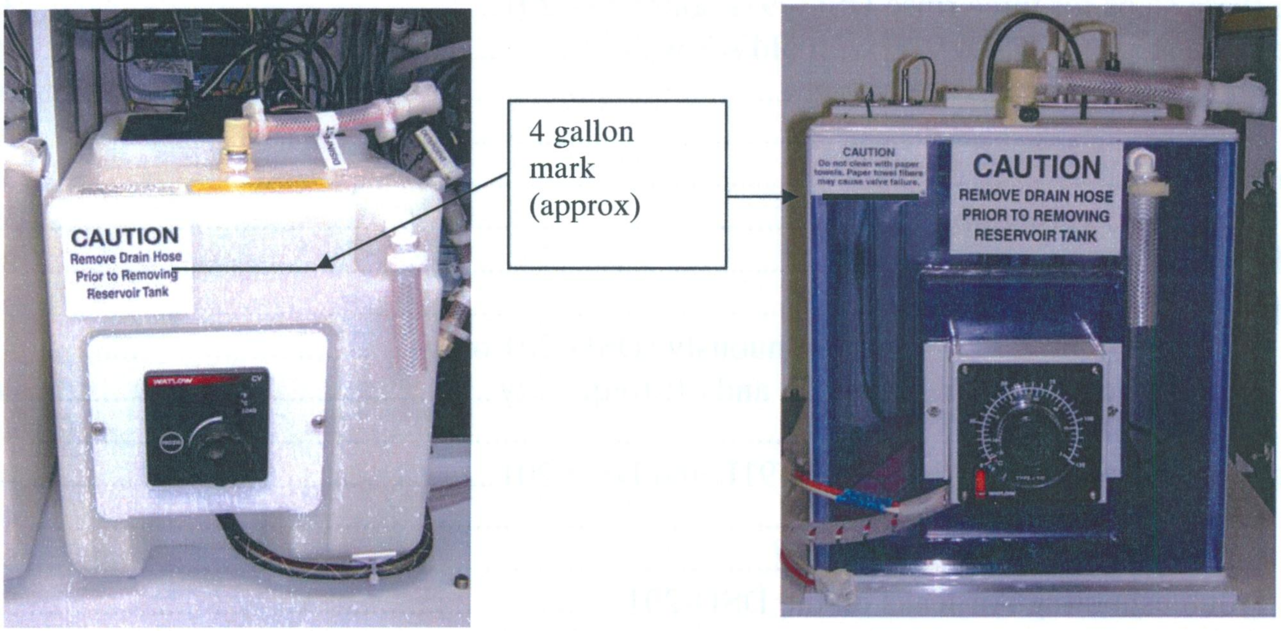
Table of contents

1. Low Dis Res Alarm (Losing Disinfectant) 4
2. Gaining disinfectant (high dis res) 7
3.Low Chamber (low cbr) 7
3.A. RINSE CYCLE 7
Use these steps for a 91E three rinse and a DSD-201 8
Use these steps FOR 91E with old software. 9
3.B. DISINFECTANT CYCLE 10
Use these steps for a 91E three rinse and a DSD-201 10
Use these steps FOR 91E with old software. 12
4. Control Panel not responding 12
5. Getting unit into idle state 13
6. Attach restrictor 13
7. No Flow (Air, Rinse, Disinfectant) 14
7.A. Air 14
7.B. Rinse- 16
7.C. Disinfectant 18
The following steps for a 91E with old software 20
8. Loading disinfectant 21
Steps for 91E without three rinse upgrade 22

9. Changing or Altering hookups 22
10. Temp Failures 23
11. Flow error (flow err) 25
12. Basin Error (basin err) 26
13. Losing disinfectant every cycle 27
14. Sheath Fail (end of cycle) 28
15. Sheath Fail (beginning of cycle) 29
16. Disinfectant warning 29
17. Printer errors 30
18. Not Draining Properly 31
Use these steps for three rinse DSD- 91E and DSD-201 31
Use these steps for DSD- 91E with old software 32
19. Changing Filters 34
Air filters 35
Water filters 35
20. Unit not powering up 35
STEP A 35
Step B 36
21. A-side air compressor runs continuously (DSD-201 only) 37
22. A-side air compressor powers on and off frequently 40
23. Buzzing Noise 42
Use these steps for three rinse DSD- 91E and DSD-201 42
24. Several Problems (DSD-201) 48
25. Disinfectant foaming 51
26. Troubleshooting Air leaks on the DSD-201 52

1. Low Dis Res Alarm (Losing Disinfectant)

The unit is sensing that the disinfectant is below the optimum running level. Return all disinfectant into reservoir tank. (Cancel, then Enter) Verify level of disinfectant. See the figure below for the respective LCG tanks. The mark shown is in reference to show the approximate 4 gallon level.


4 gallon mark (approx)
CAUTION
Remove Drain Hose Prior to Removing Reservoir Tank
CAUTION
Do not clean with paper towels. Paper towel fibers may cause valve failure.
CAUTION
REMOVE DRAIN HOSE PRIOR TO REMOVING RESERVOIR TANK
WATLOW

Low Dis Res: Most common problems:

- The ¾" drain valve seal leaking. Replace with MK01-0029.
- Debris or foreign material in drain valve: Remove from the manifold.
- DSD is not level.

Use the following steps to troubleshoot for all DSD-91E and DSD-201 models.

a. The most common item is the ¾" valve seal losing the seal. This is caused by exposure to the LCG over time. The first item to look at is the disinfectant cycle count. If the Low Dis REs alarm occurred after 50 cycles, this may be normal LCG loss.

b. If it is losing disinfectant, the ¾ inch drain valve may be stuck open or the return of the disinfectant is slow. To determine if the loss of disinfectant is due the drain valve being stuck open verses the return of the disinfectant, go to the next step. If it is not dumping go to step e.

c. Make sure the disinfectant is returning to reservoir tank in under 90 seconds. If it is not then the ¾ inch valves on the cascade overflow and disinfectant return need to be replaced. MK01-0029 is the ¾ valve replacement kit for both the dsd-91E and dsd-201.

d. To do step b, make sure basin is full of disinfectant and reservoir tank is almost empty. 91E with old software must be in idle state. Use setup 19#, 0# to disable low sensor. If basin is not full use diagnostics 18#, 8#, 7#, 6# till basin is full. Then use 0# to close valves. 18# between each number with an old 91E.

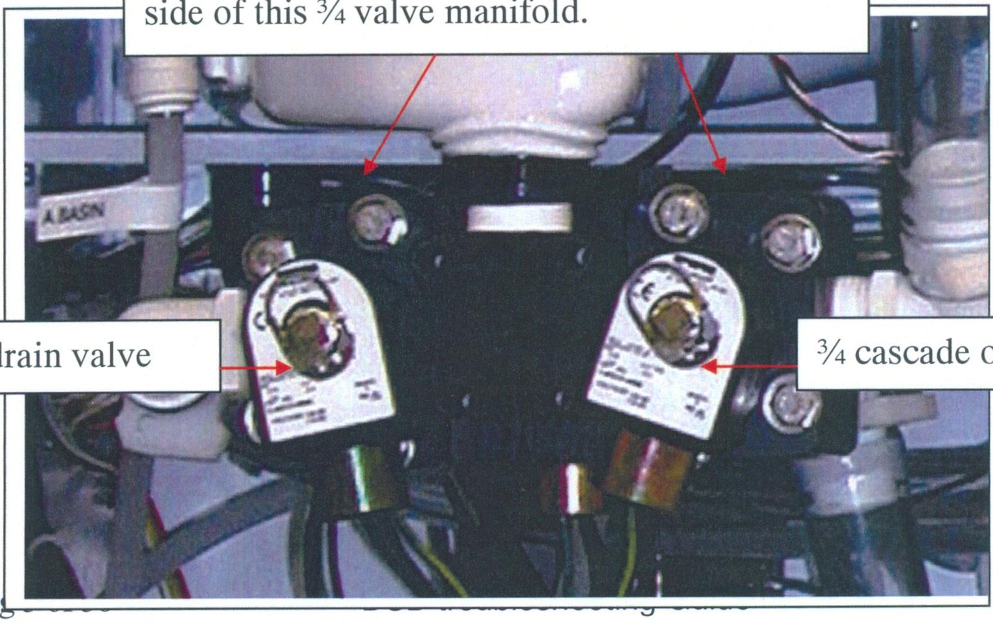
e. Use diagnostics 18#, 10#, 9# to return disinfectant. Start timing. If time is over 90 seconds replace ¾ inch cascade overflow and disinfectant return valves. 0# to close and cancel back to main screen.

f. Unit is just alarming, replace float sensor. If problem persist reseat sensor harness and check connection of sensor board to motherboard. Replace harness and/or sensor board if failure still occurs.

g. The float sensor (level sensor) for the reservoir tank is MS07-0507 for both units. Sensor board part numbers are MB01-0009 (91E old software) MB01-0024 (91E three rinse) MB01-0018 (DSD-201)

Note: Once you've determined that the drain valve is not stuck open and the return of disinfectant is under 90sec. The internal programming of the board is wrong. Verify the timing or replace the board.

Note: Disinfectant return valve is on the back side of this ¾ valve manifold.

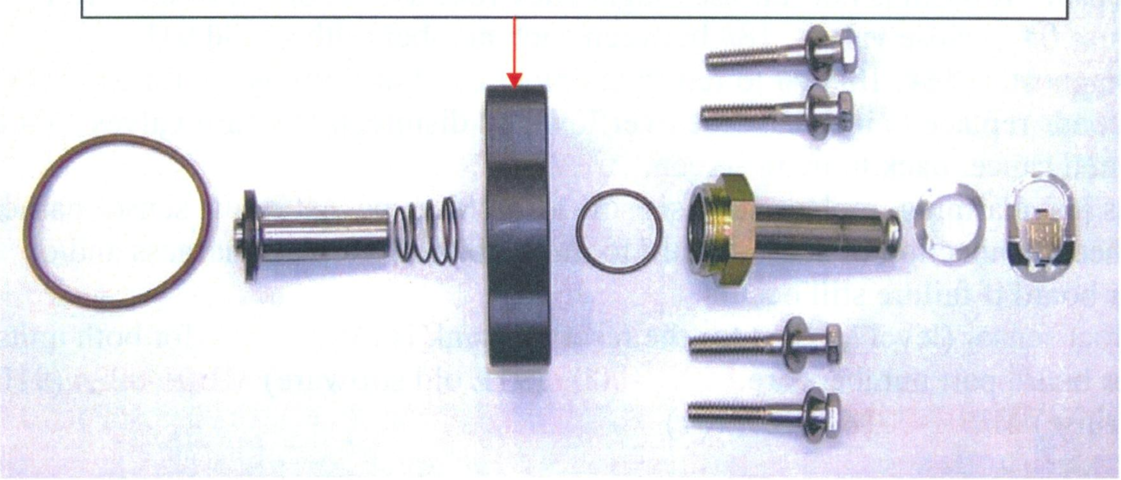


¾ drain valve

¾ cascade overflow valve

This configuration of the drain valves apply to the DSD-201 and side A-side on a 91E. For the B-side on a 91E the front valves are opposite of this picture.

Valve covers for drain and overflow are MC13-0008 and MV01-0021 for the disinfectant return. Not included in kit



This is the MK01-0029 ¾ valve kit

2. Gaining disinfectant (high dis res)

Hi Dis Res: Most common problems:

- The ¾" LCG overflow and return valves are leaking. Replace with MK01-0029.
- Debris or foreign material in the LCGvalvesRemove from the manifold.
- DSD is not level.

Use these steps for all DSD-91E and DSD-201

a. Make sure water is draining out of basin after the initial flush cycle. If not replace ¾ drain valve. MK01-0029
b. If unit is not gaining any solution go to step e above.
c. The unit is gaining disinfectant and drain valve is good. Open up the disinfectant return valve and cascade overflow valve to look for debris. Something is keeping the valves from closing.
d. If there is no debris, then change the ¾ inch return and overflow valves. MK01-0029

3.Low Chamber (low cbr)

A. Verify what part of the cycle that the low chamber is occurring. Is it during the disinfectant cycle or the rinse? If it is during the rinse use the rinse steps (3.A.) otherwise the disinfectant steps (3.B.).

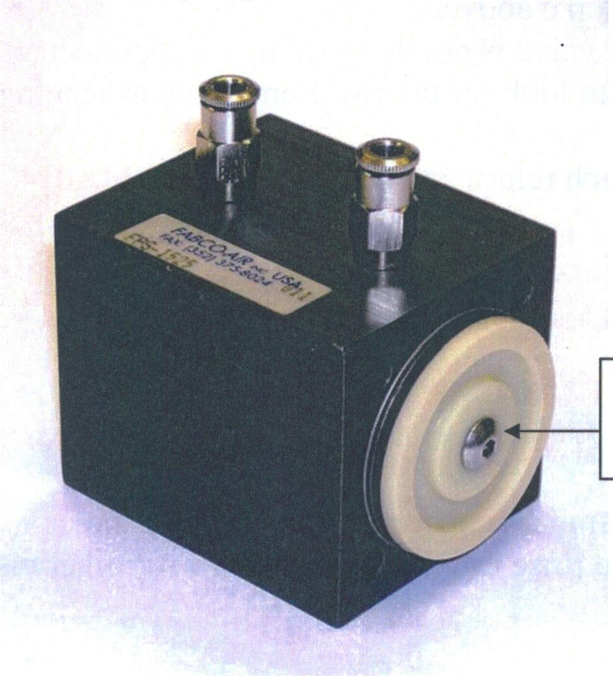
3.A. RINSE CYCLE

Most common causes of Low Chamber in the rinse cycle:

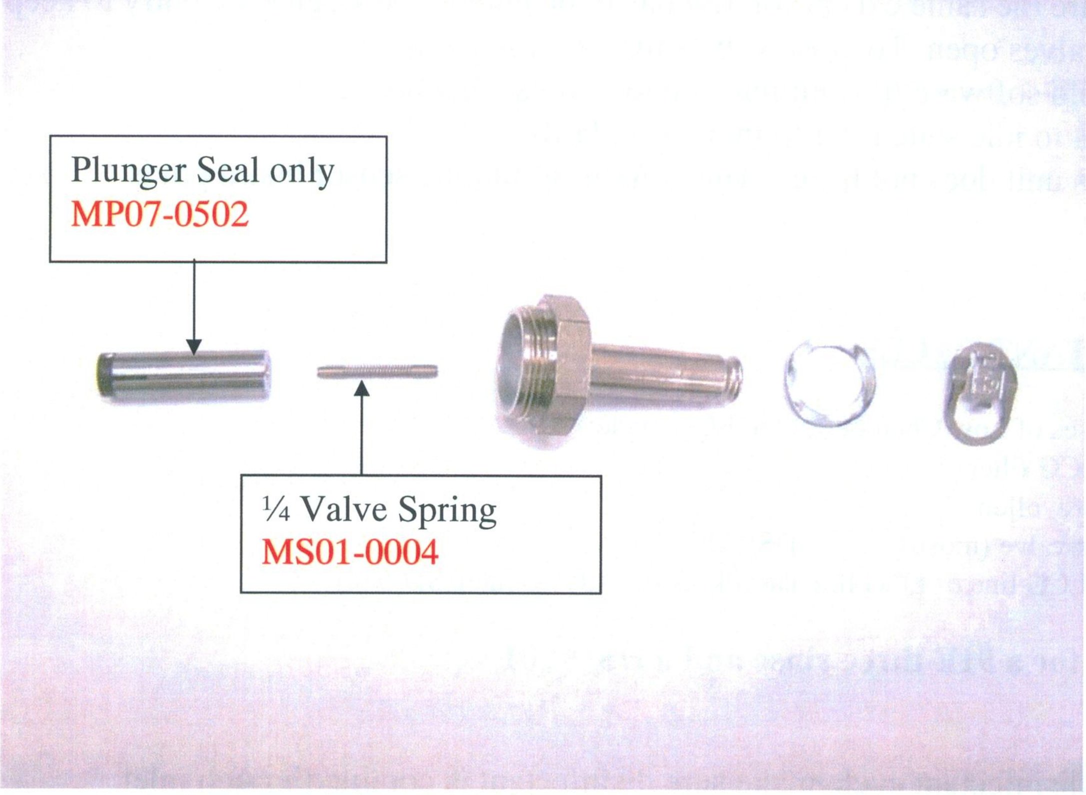
- Occluded water filters – internal or external.
- Low water pressure
- Valve seals swollen
- Stuck check valve

Use these steps for a 91E three rinse and a DSD-201

a. If all pressures are good. Incoming pressure must be 40 to 60 psi. Do not adjust regulator. Check the filters to see if they need to be changed.
b. During rinse cycle make sure water is coming through water inlet valve(scope hookup/restrictor) and a few seconds later a strong flow coming from the chamber valve on the lower left hand side of basin.
c. During the rinse cycle the basin should fill up to basin sensor on a dsd-201 in around 70 seconds and default time for low chamber is an additional two minutes. 91E is 4 minutes 10 seconds and the software will try three times before it alarms. If the unit exceeds these times change seal 78398-538(dsd-201) or MK01-0012(dsd-91E) on the chamber inlet valve. You may just order the ¼ plunger seal and spring.



78398-538 valve seal kit (includes 4 seals, 4 screws, and loctite



This is the MK01-0012 ¼ valve kit

d. Another manual method of doing step c is to use diagnostics. Select side of unit with failure. Make sure unit has no fluid in basin. Use diagnostics 11# to drain water, then 0# to close drain valve if there is water. Make sure 14# on the B side is entered regardless of which side your troubleshooting for a dsd-201. Then use 18#, 2#, 6# to open water valve and chamber valve. Make sure to start your watch.

e. If valves are not opening and closing replace valve drive board MB01-0004(dsd-91E) or MB01-0019(dsd-201)

f. In diagnostics unit will not alarm so you must use 0# to shut off valves after you have documented your time. Use 11# to drain again. 0# to close.

g. If problem continues check connection of basin sensor and sensor harness to sensor board. Recede harness to sensor board. The basin sensor should be replaced if problem persist. ASM1-0104(dsd-201) or MH05-0016(dsd-91E).

h. The next likely cause would be the sensor board MB01-0018(dsd-201), MB01-0024(dsd-91E) and/or sensor harness MH05-0043 (dsd-201), MH05-0006(dsd-91E)

Use these steps FOR 91E with old software.

a. All steps are the same except for 18# has to be entered between each entry to keep multiple valves open. To close valves just enter # again.
   With the old software the unit must be idle to use diagnostics.
b. To get unit to idle state refer to index standards.
c. NOTE this unit does not have a sensor harness and the sensor board p/n is MB01-0009

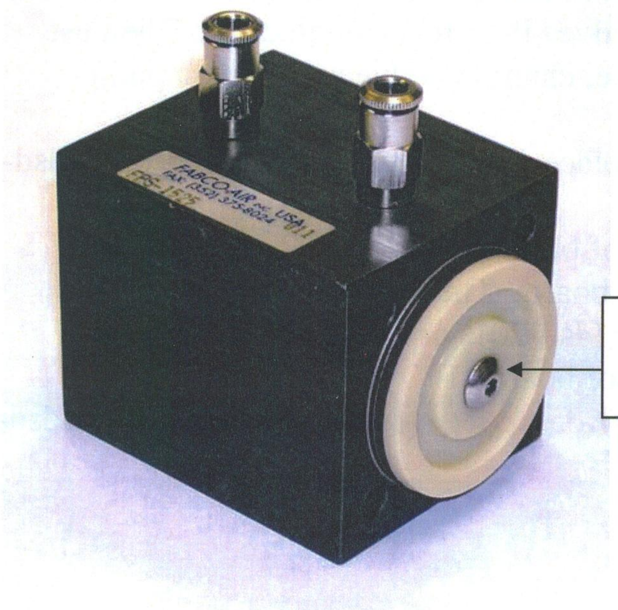
3.B. DISINFECTANT CYCLE

Most common causes of Low Chamber in the LCG cycle:

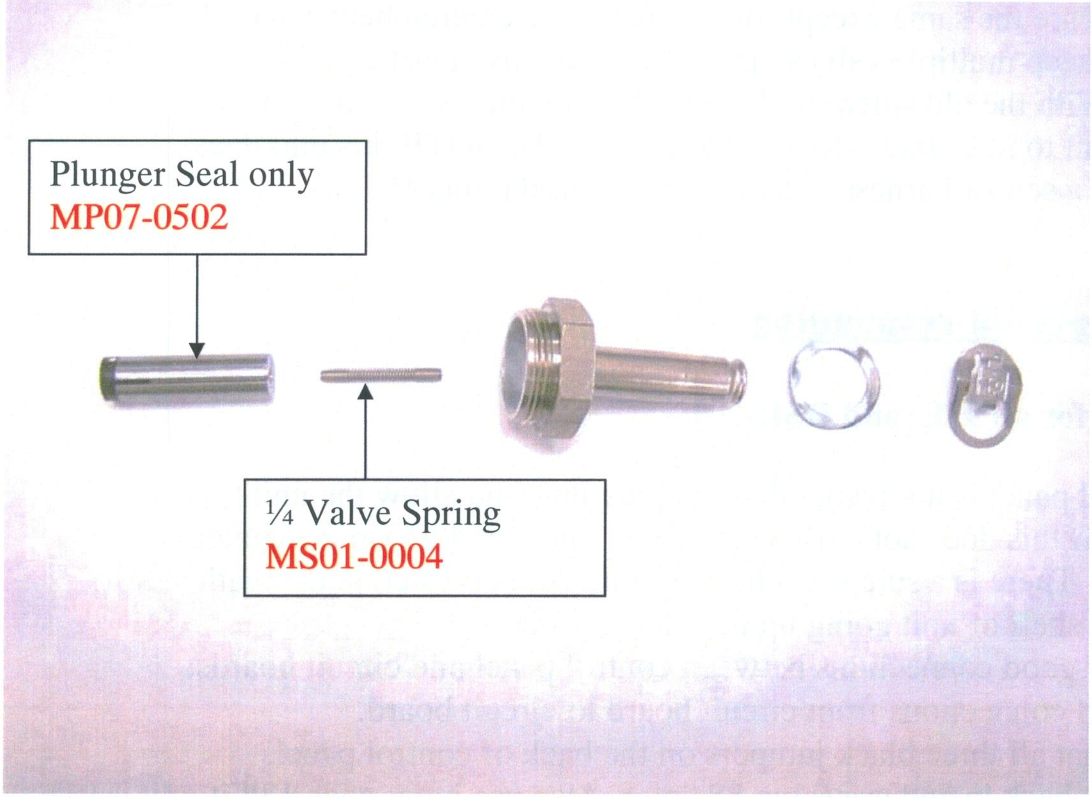
- Occluded LCG filter
- Valve seals swollen
- Stuck check valve (mostly on the DSD-201)
- Lint in the LCG line or LCG line has a kink (mostly on the DSD-91e)

Use these steps for a 91E three rinse and a DSD-201

a. During disinfectant cycle make sure disinfectant is coming through inlet valve(scope hookup/restrictor) and a few seconds later a strong flow coming from the chamber valve on the lower left hand side of basin.
b. During the disinfectant cycle the basin should fill up to basin sensor on a dsd-201 in around 90 seconds. 91E is 4 minutes 10 seconds and the software will try three times before it alarms. If the unit exceeds these times change seal 78398-538(dsd-201) or MK01-0012(dsd-91E) on the chamber inlet valve. You may just order the ¼ plunger seal and spring.



78398-538 valve seal kit (includes
4 seals, 4 screws, and lock tite



Plunger Seal only
MP07-0502

¼ Valve Spring
MS01-0004

This is the MK01-0012 ¼ valve kit

c. If the flow is weak after seals or plunger have been changed, change disinfectant pump DSD-1074(dsd-91E), A-side 78398-466 or B-side 78398-467 for a dsd-201

d. Another manual method of doing step c is to use diagnostics. Select side of unit with failure. Make sure unit has no fluid in basin. Use diagnostics 18#, 10#, 9# to return disinfectant, then 0# to close valves if there is disinfectant. Then use 18#, 8#, 7#, 6# to open disinfectant valve, chamber valve and turn on pump. Make sure to start your watch.
e. If valves are not opening and closing replace valve drive board MB01-0004(dsd-91E) or MB01-0018(dsd-201)
f. If problem continues check connection of basin sensor and sensor harness to sensor board. Recede harness to sensor board. The basin sensor should be replaced if problem persist. ASM1-0104(dsd-201) or MH05-0016(dsd-91E).
g. The next likely cause would be the sensor board MB01-0018(dsd-201), MB01-0024(dsd-91E) and/or sensor harness MH05-0043 (dsd-201), MH05-0006(dsd-91E)

Use these steps FOR 91E with old software.

a. All steps are the same except for 18# has to be entered between each entry to keep multiple valves open. To close valves just enter # again. With the old software the unit must be idle to use diagnostics.
b. To get unit to idle state refer to index standards. NOTE this unit does not have a sensor harness and the sensor board p/n is MB01-0009

4. Control Panel not responding

Use these steps for all 91E and DSD-201

a. If control panel is not responding, unplug unit and allow the unit to reboot. If this does not work unplug unit again and lift up the center console. There is a screw holding console down located underneath the front shelf of unit going up into the console.
b. Look for good connections between control panel and circuit boards. Check all connections from circuit board to circuit board.
c. Verify that all three black jumpers on the back of control panel.
d. Plug unit back in and use setup 88 enter. Also use input code 135 if unit is 91E three rinse or a DSD-201. Then enter diagnostics 25. Push every button on the control panel several times and there should be a different number that pops up on

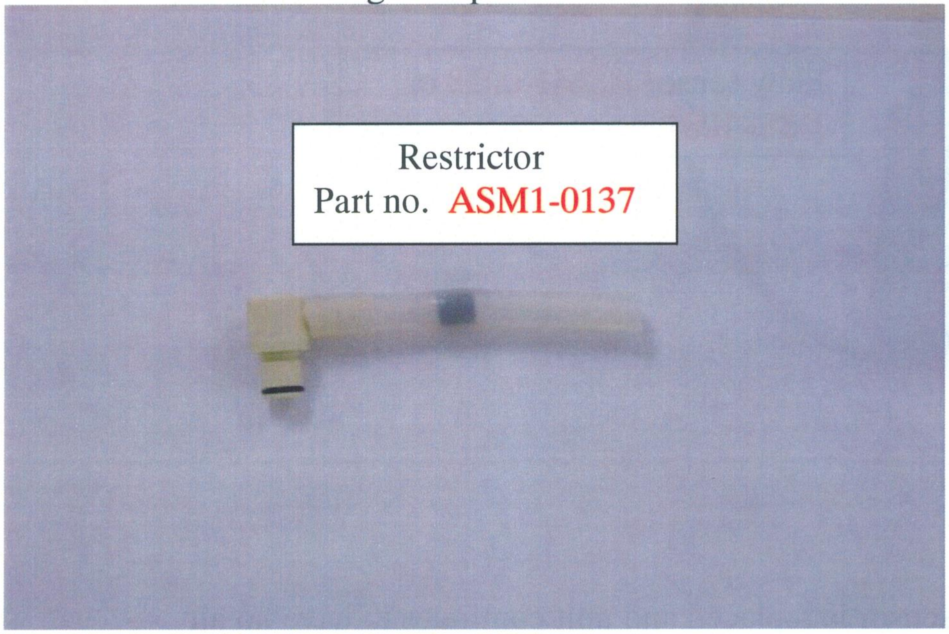
the LCD screen. If not order a control panel. MB01-0006 for 91E or MB01-0022 for DSD-201.

5. Getting unit into idle state

a. Select the side of the unit you want returned to idle state
b. Press cancel then enter.
c. If unit does not go into idle state due to a failure, troubleshoot the failure or disable the sensor that is causing the failure. Remember to enable the sensor once the unit is back into idle state.
d. Use diagnostics 89 enter when working with newer 91E software and DSD-201 for a shortcut. This step can used by a trained technician only. If you use this step make sure that all fluid is where it belongs. Water is drain and disinfectant is returned.

6. Attach restrictor

a. The restrictor is part of the accessory kit, which is pictured below.
It is used to simulate a hookup when testing the unit or performing a task other than disinfecting a scope.



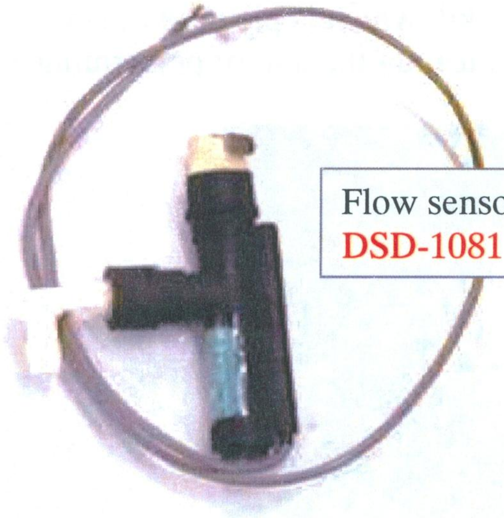
7. No Flow (Air, Rinse, Disinfectant)

7.A. Air

Use these steps for a 91E three rinse and a DSD-201

a. Install a hookup or restrictor. Make sure unit is in idle state. Press add air button. Look at question 4 if you have trouble getting unit to Idle State. Check to see if air is coming out of the Hookup or restrictor. If air is not, go to step d.

b. If air is coming out check connections of the flow sensor to sensor board and recede sensor harness. Reset unit. If problem persist change flow sensor ASM1-0098(dsd-201) or DSD-1081(91E). Picture of flow sensor located below.



Flow sensor ASM1-0098 or DSD-1081

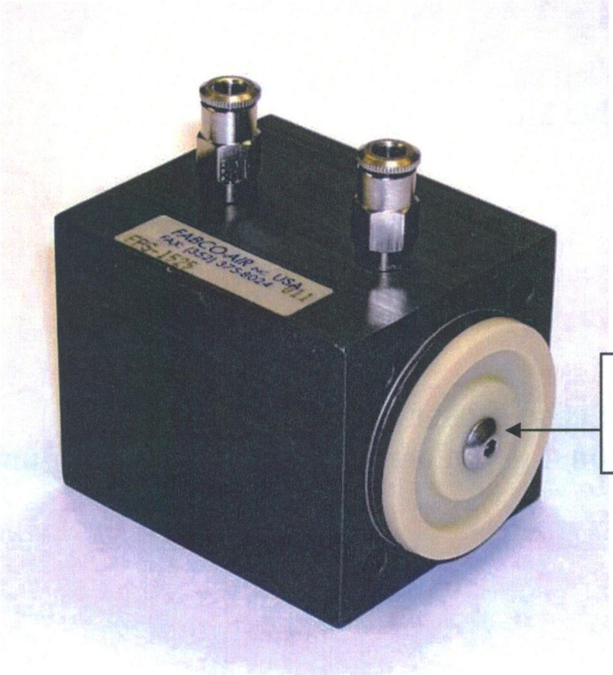
c. After the flow sensor is replaced and unit continues to have no air flow change sensor board MB01-0018(dsd-201), MB01-0024 (dsd-91E) and sensor harness MH05-0043(dsd-201), MH05-0006 (91E)

d. Go to flow sensor and shake it to see if it rattles. If it does not rattle it is jammed. Try to free it or order a new flow sensor ASM1-0098(dsd-201) or DSD-1081(91E).

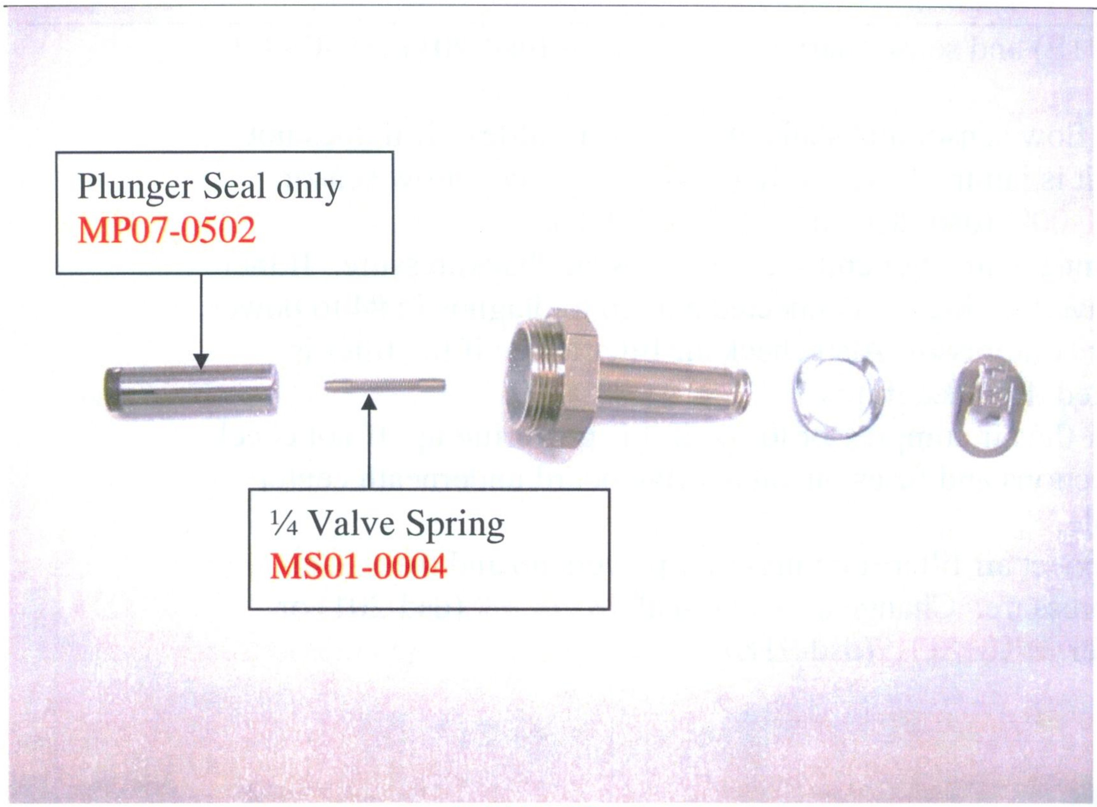
e. Disconnect air filter and see if there is any backpressure. If there is, leave the filter disconnected and go to diagnostic #4 to power up air compressor. Also check air filter to see if the filter is blocked. Replace if it is.

f. Check the air compressor to see if it is powering up. If not check connections and fuses on valve drive board underneath center console.

g. Reconnect air filter if compressor powers up and there is no backpressure. Change air valve seal 78398-538(dsd-201) or plunger MK01-0012(dsd-91E).



78398-538 valve seal kit (includes 4 seals, 4 screws, and lock tite



This is the MK01-0012 ¼ valve kit

Note these steps for 91E with old software

The steps are the same as above, but there is no sensor harness and the sensor board p/n is MB01-0009. Look at question 4 if you are having trouble getting unit into Idle State.

7.B. Rinse-

check all internal and external pressures first

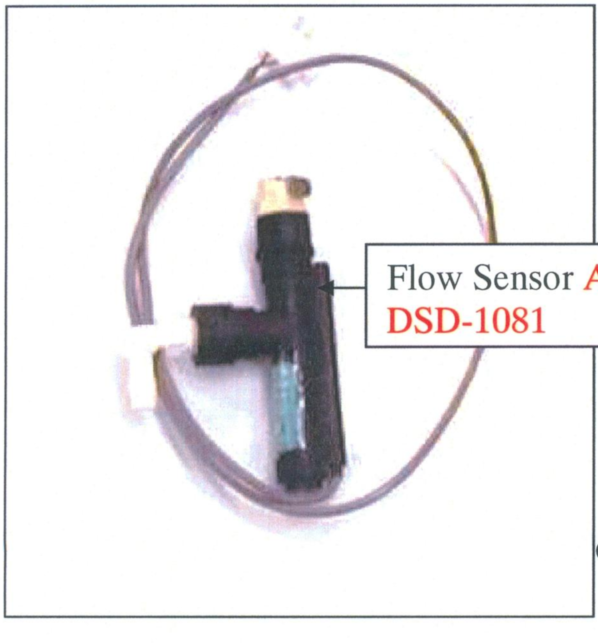
Use these steps for a 91E three rinse and a DSD-201

a. Check all filters internal and external. Disconnect and reconnect hookup connectors related to water lines.

b. After you have made sure all connections are good try opening the bleeder valve to allow any air in line to purge. On a dsd-201 only, make sure inlet valve diagnostics 14 is open. If there is not a steady stream of water coming out and everything else checks good replace seal(dsd-201) 78398-538
c. Shut off water and go to flow sensor. Shake the sensor and see if there is a rattle. If not, your sensor is jammed and needs to be replaced. DSD-1081 for dsd-91E and ASM1-0098 for dsd-201. Also verify connection of sensor. A picture of the flow sensor is located below. Picture of flow sensor located below.
d. If sensor is good, disconnect sensor at the quick connect and add air. If no air comes out the line is clogged. If air does come out and water pressure/filters are all good the water inlet valve for that side of the unit is bad. Change Seal(dsd-201) 78398-538 or plunger(dsd-91E) MK01-0012
e. If there is a loud buzzing sound, the eletro/mechanical valve manifold my need to be replaced. This could also be the reason a valve is not opening. This applies to a DSD-201 only.
f. If failure persists and all is well then it is an electrical failure. The sensor, sensor harness and or sensor board need to be replaced.
DSD-201 sensor(ASM1-0098), sensor harness(MH05-0043), sensor board(MB01-0018)
DSD-91E sensor(DSD-1081), sensor harness (MH05-0006), sensor board(MB01-0024)

Steps for 91E without three rinse upgrade

a. Steps are same as above, but the following part numbers are different.
Sensor board(MB01-0009) no sensor harness is needed.

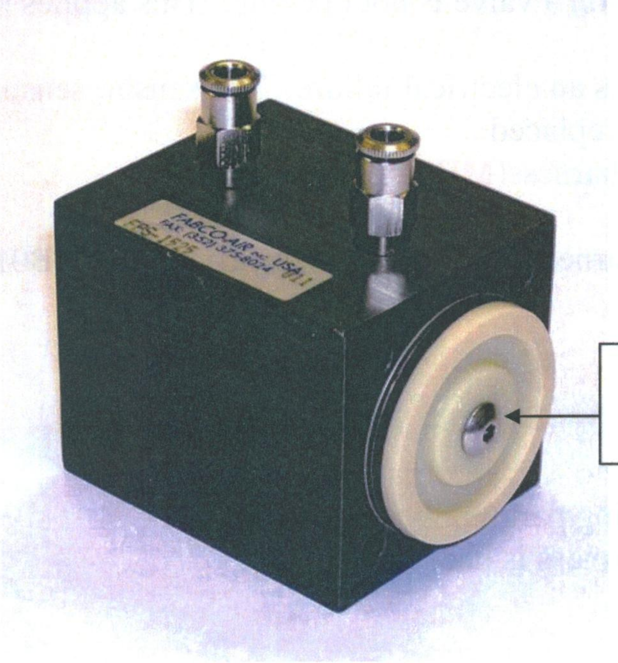


Flow Sensor ASM1-0098 or DSD-1081

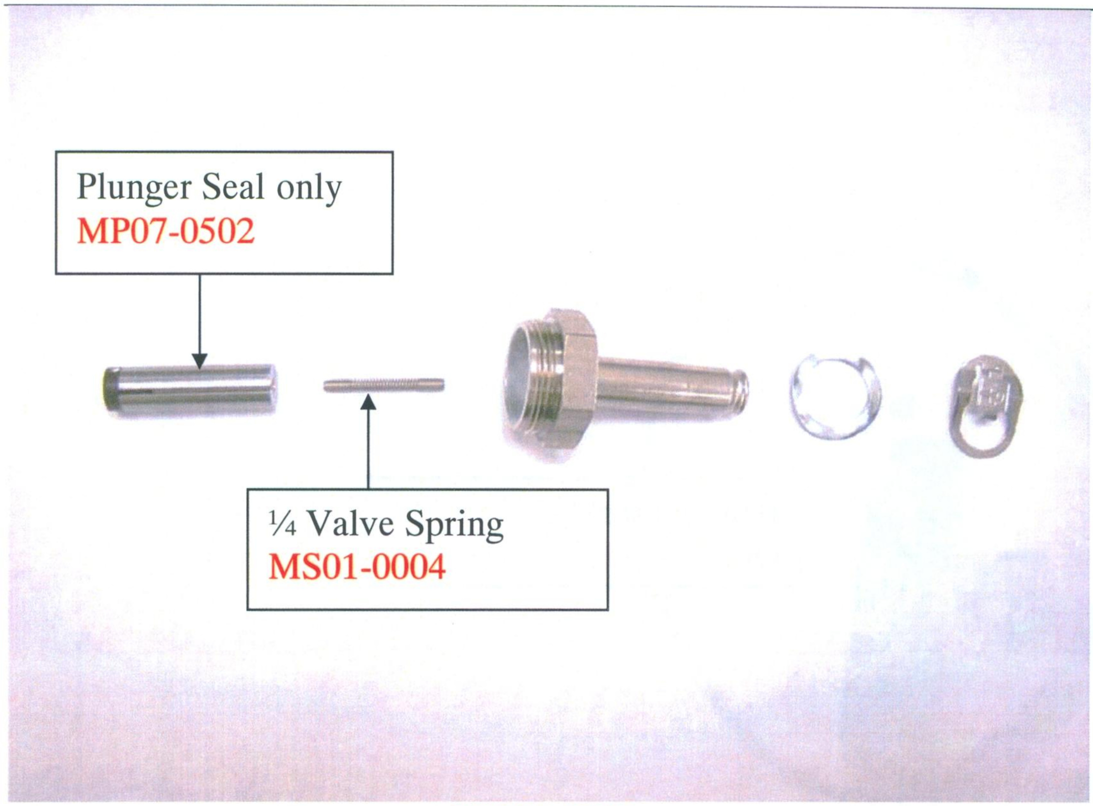
7.C. Disinfectant

Use these steps for a 91E three rinse and a DSD-201

a. Try replacing disinfectant filter.
b. Install another scope hookup or 4 inch restrictor. Go to diagnostics and use 18#, 8#, 7#. User must go to disinfectant cycle and look for disinfectant coming out of hookup or restrictor. If not and pump is running replace the seal 78398-538(dsd-201) or plunger MK01-0012(91E) for disinfectant valve. Press 0# to shut off pump and close valves. Check connections to pump and look for any blown fuses under center console if pump is not running.

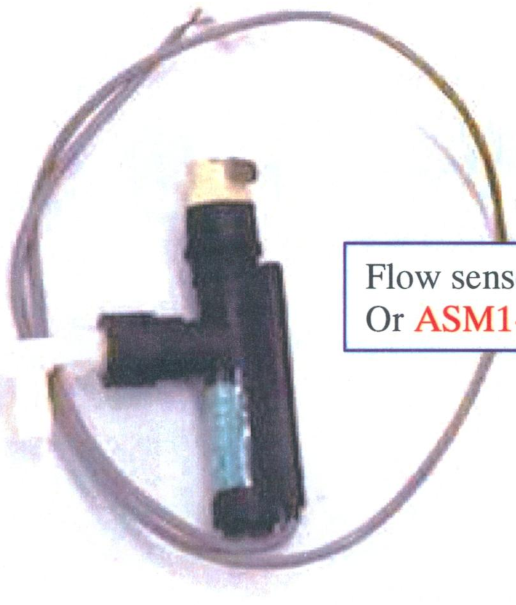


78398-538 valve seal kit (includes 4 seals, 4 screws, and lock tite


Plunger Seal only
MP07-0502
¼ Valve Spring
MS01-0004

This is the MK01-0012 ¼ valve kit

c. If there is a strong stream of disinfectant go to the flow sensor and shake it. If there is no rattle the flow sensor is jammed.
d. If the flow sensor does rattle check connection of flow sensor to sensor board.
e. The connection to sensor board sensor harness is good replace flow sensor DSD-1081(91E) or ASM1-0098(dsd-201)



Flow sensor DSD-1081
Or ASM1-00098

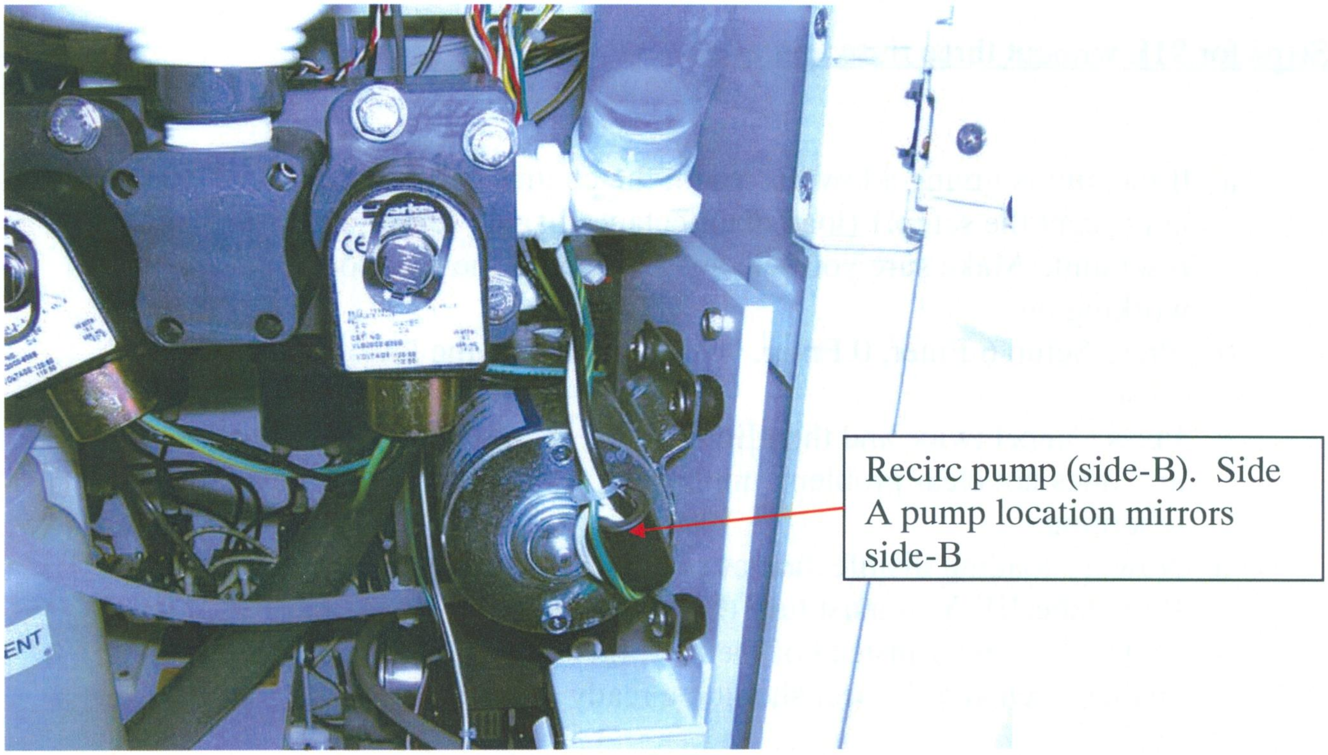
f. If problem persist change sensor board MB01-0024(91E), sensor harness MH05-0006 or sensor board MB01-0018(dsd-201), sensor harness MH05-0043(dsd-201)

The following steps for a 91E with old software

a. same as above
b. Make sure unit is in idle state. Install another hookup or 4 inch restrictor. Go to diagnostics and use 18#, 8#, 18#, 7#. The rest of this step and the other steps are the same as above. Except for this unit does not have a sensor harness and the sensor board p/n is MB01-0009

Note: If no flow error occurs during cascade overflow, basin full of disinfectant, use these steps.

a. Go to diagnostics 88# and set the recir. Option to 0# to disable it.
b. Only if unit does not have recirculation pumps.



8. Loading disinfectant

Use these steps for a 91E three rinse and a DSD-201

a. If the unit is giving a low dis res on the control panel and will not accept the setup 1 (load disinfectant) disable sensor and reset unit. Make sure you selected the side of the unit your working on.
b. Use setup 88 enter, input code 135 enter, 43 enter and then 0 Enter. This will disable the low disinfectant sensor.
c. Press 89 enter to put unit back into idle state. Then press cancel once. You will be back on the setup item screen.

d. Now press 1 enter and load disinfectant as normal. As per the manual.
e. Remember!!!! You must turn the sensor back on. Use step b and press 1 enter instead of the 0. Cancel twice to get back to main screen and the unit should be ready to go.

Steps for 91E without three rinse upgrade

a. If the unit is giving a low dis res on the control panel and will not accept the setup 1 (load disinfectant) disable sensor and reset unit. Make sure you selected the side of the unit your working on.
b. Press Setup 6 Enter, 0 Enter. This will disable the low dis. res sensor.
c. Press Cancel twice and then Enter. This should reset the unit. If unit does not clear problem, unplug the unit and allow it to reset by rebooting.
d. Now try loading disinfectant as per manual. (Setup 1 Enter)
e. Remember!!!! You must turn the sensor back on. Use step b and press 1 enter instead of the 0. Cancel twice to get back to main screen and the unit should be ready to go.

Note: To load disinfectant through diagnostics, press 9#, 18#, 10#. This will open the disinfectant return valves. In a 91E that does not have three rinse software, the unit must be in idle state.

9. Changing or Altering hookups

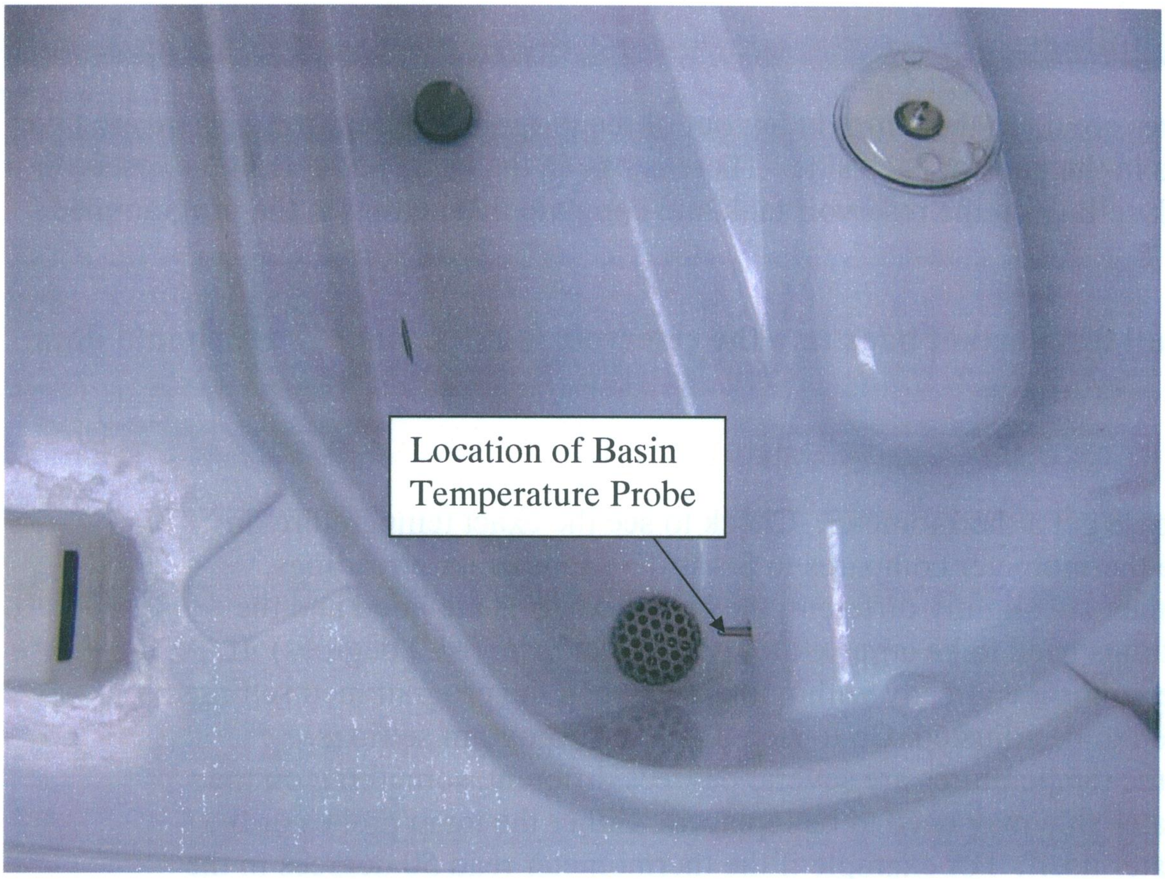
The hookups currently sold have been designed and tested and validated for the use on the DSD/SSD AERs as they pertain to each endoscope model. Modifications to the hookups are never authorized, regardless of the similarity of the scopes.

10. Temp Failures

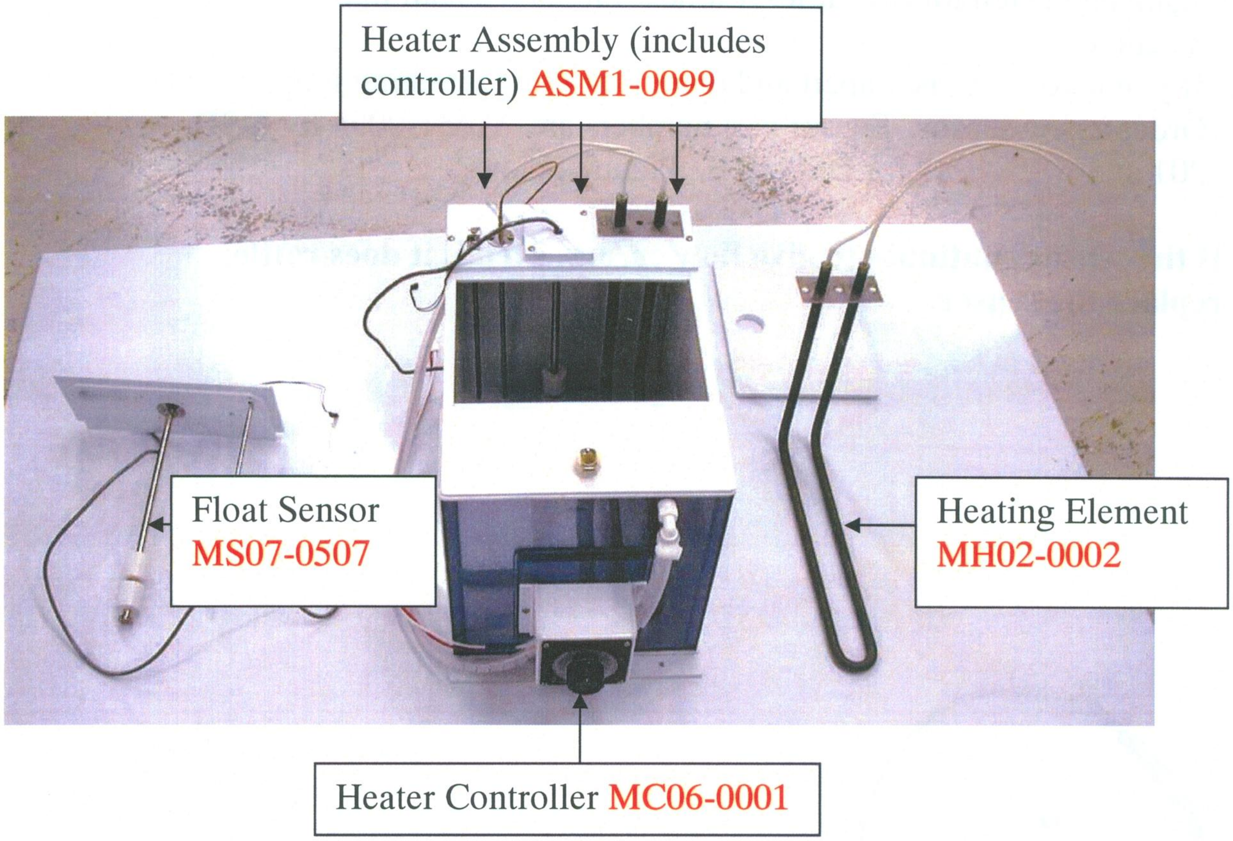
Temp failures are do to the temps being out of the programmed settings. There are two temp probes in the unit for each side. There is one in the basin and one in the reservoir tank. Check setting on the reservoir tank and compare that setting to the programmed setting.

Note: Put all disinfectant back into the reservoir tank! Cancel Enter should does this.

a. Please get a thermometer. Check to see the exact temperature on the thermometer compares to Setup 13's temperature readings.
b. If they are slightly different, the heater controls are good and the settings need to be adjusted to within tolerance. (+/-2 degrees) If the temps are already within tolerance then the programmed settings need to be adjusted. Go to step d to adjust program settings.
c. If the temperatures are several degrees different, something on the heater side may need to be replaced. Either the temp probes or the heater itself. For example if the thermometer read 50 degrees in the reservoir tank and the dial on the reservoir tank was set at 40 degrees. The thermo dial, heating element, or temperature probe is bad. Order the **ASM1-0099** heater plate assembly, which will have all three components. Picture shows illustration with part numbers. If the temperature reading on the dial is what you are finding on thermometer go to step f
d. The programmed settings can be adjusted by going into diagnostics. If the temperature problem is in the reservoir tank, use this step. If it's in the basin go to the next step. Press Setup 88 Enter, then 135 Enter, diagnostics should be displayed on your screen. Now press 74 Enter for the maximum reservoir temperature. It should be set at 45 degrees, if not set it by pressing 45 Enter. Cancel twice to go back to main screen
e. Press Setup 88 Enter, then 135 Enter, diagnostics should be displayed on your screen. Now press 75 Enter for the minimum basin temperature. This should be set at 10 degrees. If not press 10 Enter and then cancel twice to go back to main screen.



f. If the programmed settings are good and the thermometer reading is close to the actual set temperature on the reservoir dial. Then the unit has a problem reading the accurate temperature. Either the temp probes are bad or the mother board is bad. The basin temperature should be reading ambient temperature. If neither of these are what you find at this point replace the temperature probes. Basin temp probe ??????? Reservoir probe ???????? If these are replaced and the unit still does not read the correct temperature change the mother board MB01-0016


Heater Assembly (includes controller) ASM1-0099
Float Sensor MS07-0507
Heating Element MH02-0002
Heater Controller MC06-0001

11. Flow error (flow err)

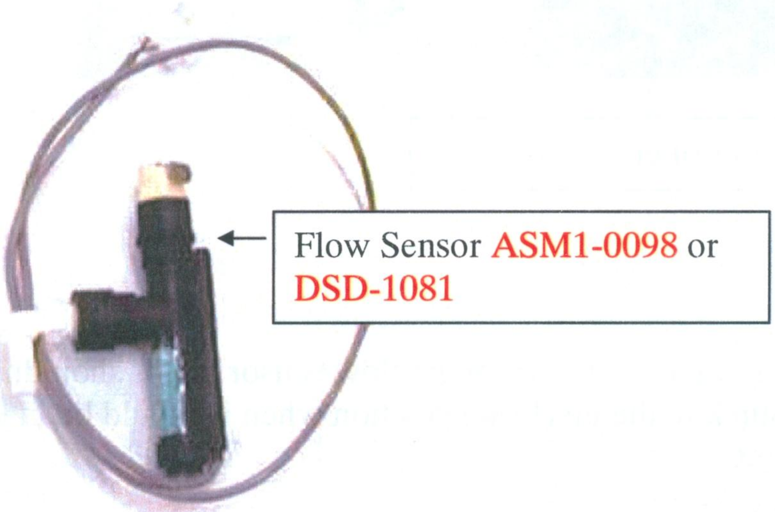
Flow error is due to the unit getting a reading from the flow sensor that it shouldn't. This means that the flow sensor is stuck in the up (flow) position when it should be in the down position indicating no flow.

a. Locate the flow sensor(show below). It is suspended underneath the basin on a 91E. On a DSD-201 it is located on top of the water regulators.
b. On a DSD-201 disconnect the flow sensor at the quick connect (directly above the water regulator). For a 91E you don't need to disconnect anything. Once you have a hold of the flow sensor shake it. If you hear it rattle that means the bobber inside is now freed up and functional. Connect the sensor back up and reset the unit.
c. If there is no rattle, remove the flow sensor completely. You can

order the flow sensor or take it apart and inspect it for debris. Remove debris if you find any and reassemble the sensor. Shake it again and listen for the rattle. If it now rattles reinstall into the machine.

d. If you take the sensor apart and there is nothing jamming it up. Order a new sensor. Sensor part numbers are ASM1-0098 for DSD-201 and DSD-1081 for DSD-91E. Picture below.

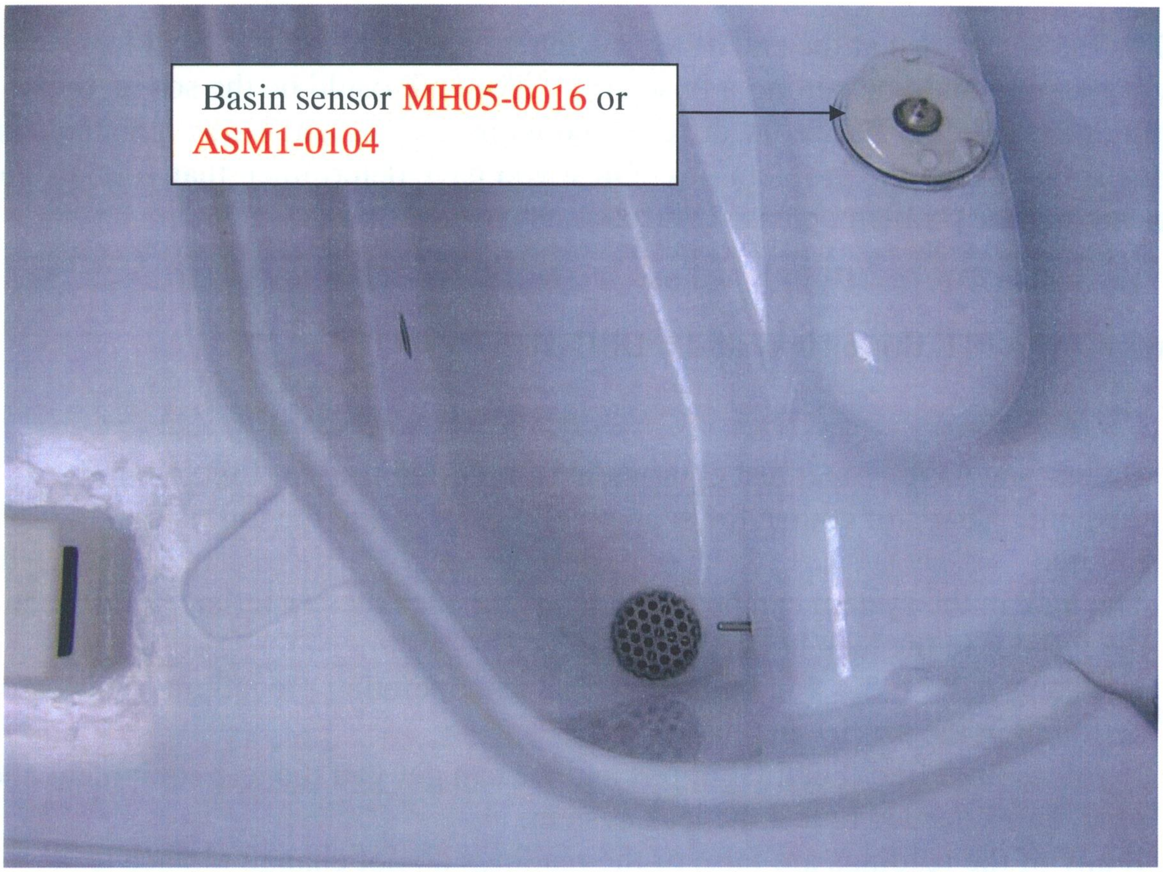
Note: **If the sensor continues to give flow errors, even if it does rattle, replace the sensor.**



Flow Sensor ASM1-0098 or DSD-1081

12. Basin Error (basin err)

Basin Sensor is getting a reading that it shouldn't. Example the basin is empty and the sensor is indicating its full. This problem can usually be easily fixed by cleaning the basin sensor cover located in the center of the basin. Just pop of the cover and wipe it down. Then replace it and continue cycle. If unit does not continue reset it by pressing cancel and then enter. If problem persist replace basin sensor. MH05-0016(DSD-91E) or ASM1-0104.(DSD-201)



13. Losing disinfectant every cycle

The unit inherently looses a small amount of disinfectant and slightly dilutes the disinfectant on every cycle. This varies from unit to unit, but you should **not** get a low disinfectant alarm until after 30 cycles. So if your facility runs numerous cycles before the elapsed time of your disinfectant is up, you will need to add some disinfectant between change outs. Make sure you add slowly back up to the normal fill line or reference. Please be sure to measure the MRC level at all times.

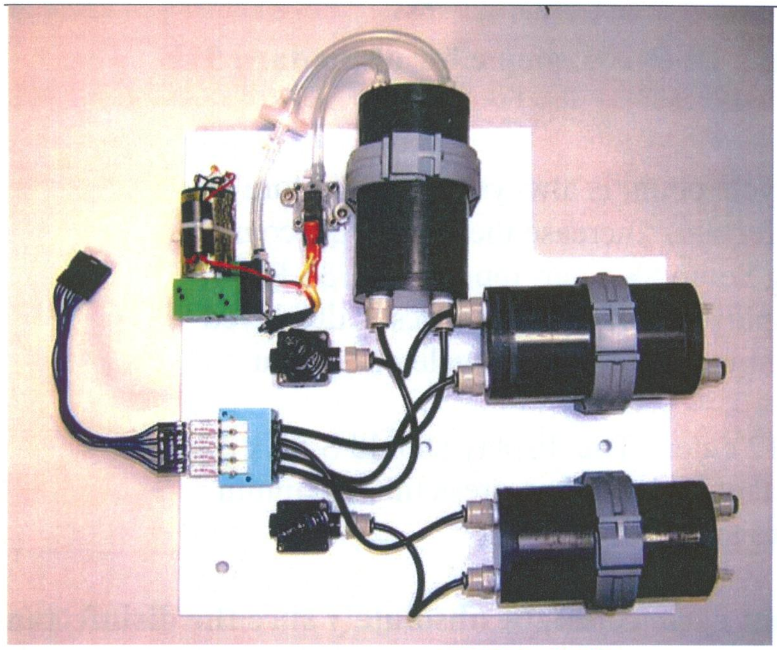
14. Sheath Fail (end of cycle)

If the unit fails the sheath test at the end of the cycle that means there is a small leak somewhere or the unit could be getting a false error. The leak could be the scope, the scope hookup or the system. Please try different hookups, scopes and/or the other side of the unit to determine where the problem lies. Once you have determined that your scopes and hookups are not the problem, please call for assistance.

Use these steps for a 91E three rinse and a DSD-201

a. Unless you have proper test equipment troubleshooting for this failure is difficult. That's of course the scope really is good and the unit is causing failure.
b. The leak in the system can be found by using a leak tester inflator. Connect the inflator to the leak hookup in basin.
c. Use steps 6.3.4-6.3.4.4 in DSD-201 final test operating procedure. This can be found in the service manual as well.
d. If you can not find it call Olympus and we can get you the test equipment and procedures needed to test the leak system.
e. If any of the readings are false or the readings do not change replace leak tester board MB01-0020 and the leak tester assembly. (ASM1-0080)
f. If the readings are good and the pressure just can't be sustained. Replace the leak tester assembly. The leak tester pump is continuously running change the assembly also. Along with the tubing MT01-0005 (3ft), this is the clear tubing that runs from the assembly to the leak tester board.

NOTE: Leak tester is only available with old DSD-91E software in international units. Must use leak tester test found in the final test of an old 91E.



Leak Tester Assembly ASM1-0080

15. Sheath Fail (beginning of cycle)

If the unit fails the sheath test at the beginning of the cycle that means there is a large leak somewhere or the unit may be getting a false error.. The leak could be the scope, the scope hookup or the system. Please try different hookups, different scopes and/or the other side of the unit to determine where the problem lies. Once you have determined that your scopes and hookups are not the problem, please call for assistance.

16. Disinfectant warning

The unit gives a warning when is comes with in ten cycles of the maximum cycle count. Check to see if the disinfectant meets the MRC level then use the following steps.

a. Press setup 7, then enter. The display will show disinfectant warning acknowledge (dis. warn. ackn). Then press 0 enter. This will allow you to run the 10 remaining cycles. (programmed max cycle count)

Use step b for a 91E three rinse and a DSD-201, step c for a standard 91E

b. If you find that the max cycle count is always reached before its time to change your disinfectant. Increase the max cycle count. This can be done by using Setup 88 enter, input code 135 Enter. Diagnostics should be displayed. Once diagnostics is displayed press 71 enter. You can now enter the max cycle count you would like.
c. Press Setup button, then 12 enter. The display should S max dis for set maximum disinfectant count. Then press the maximum cycle count you would like and enter.

Note: If increasing your disinfectant cycle count, be absolutely sure the disinfectant meets the minimum MRC level.

17. Printer errors

One of the reasons a unit may have printing errors is due to the memory being full. Please use the following steps to clear log and isolate the problem.

a. Press Setup Button, then 10 Enter. The display on your LCD screen should show Clear log? Then press Enter again to clear the log. Repeat this step for the other side of the unit.
b. Now run a cycle and see if it prints at the end or after you've entered Setup 25 on a 91E with old software.
c. If the unit still does not print unplug it and plug it back in. If it prints out the word ready then the printer is more than likely good.
d. Reset unit by unplugging it and plugging it back in. If the printer still prints ready, but will not print the run there are only two things that can cause this. The printer is not receiving a signal from the mother board (CPU) or the mother board is not sending the signal.
e. Order both the printer cable MC08-0504 and the mother board. MB01-0003 (91E old software) MB01-0021 (91E new software)

or MB01-0016 (DSD-201)

Note: If the print out is just weak, then you will just need to order a new printer ribbon. **MP10-0500 (p/n for printer ribbon) The printer part number is MP10-0000**

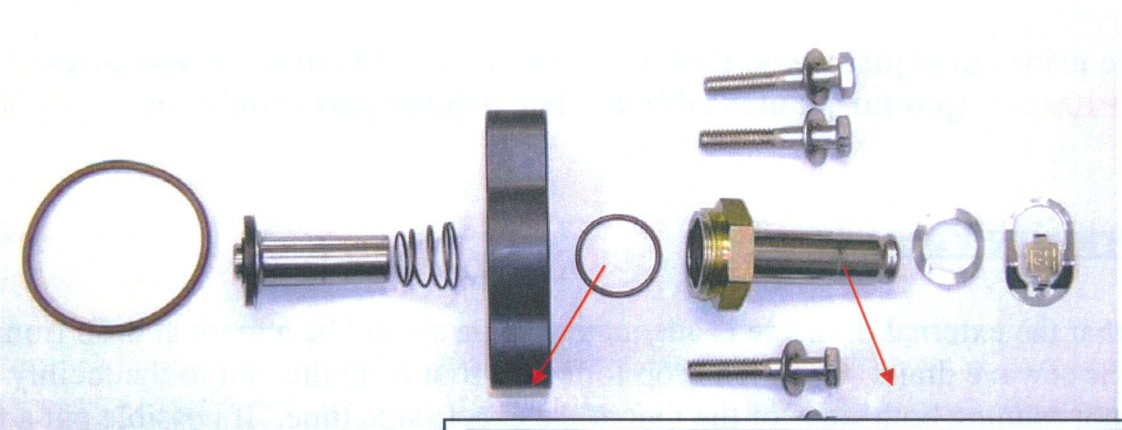
18. Not Draining Properly

Make sure that the external drainage is adequate. There should be a gradual drop from the unit to the sewage drain. One inch drop for every foot from the unit to the facility drain. Try not running both sides of the unit at the exact same time. If possible put a few minutes between starting the two sides. Use the following steps if problem continues.

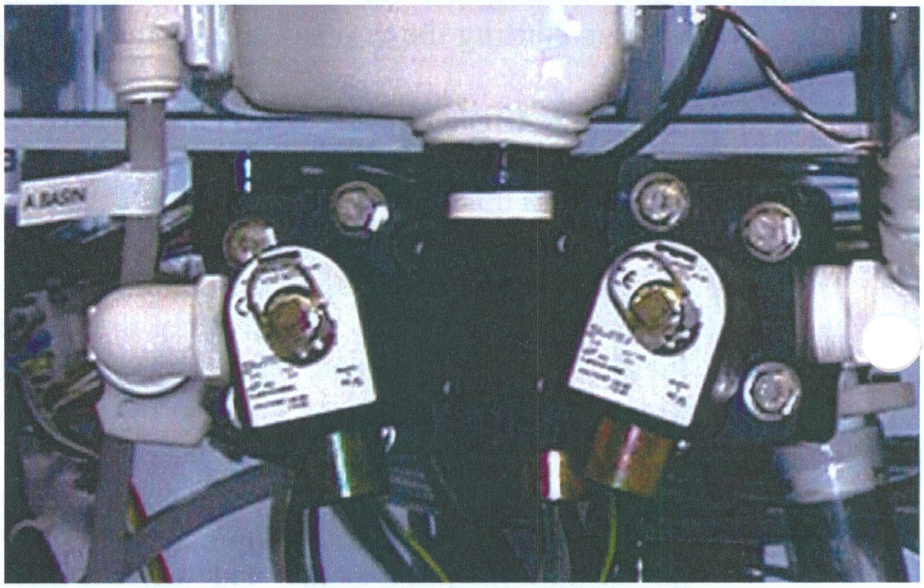
Use these steps for three rinse DSD- 91E and DSD-201

a. If unit does not have proper drainage then water will be left in the basin.
b. Go to diagnostics. Press Setup 88 Enter, then Input Code 135 Enter. Diagnostics should be displayed on the LCD screen. Use diagnostics 11# to drain remaining water. If unit is not in idle state use 89#, # to set idle state. Press Cancel Twice to get back to the main screen.
c. Run a cycle as normal and take the time of how long it takes the water to leave the basin during the rinse cycle.
d. If time exceeds 90 seconds observe the water going out the drain tube. If the water looks like it is backed up and waiting to go out the facility main drain, reconfigure the drain setup. The water is just slow coming through the drain. Replace the ¾ inch drain valve MK01-0029. The valve connected to drain tubing inside unit.
e. If the drain setup outside the unit is not visible and the time exceeds 90 seconds just change the ¾ inch valve.
f. The time did not exceed the 90 seconds add air time to the end of your program. This will keep each side of the unit far enough apart to avoid retaining water by draining at the exact time.
g. Look behind drain screen and inside drain manifold. (Gray block attached to basin.)

Valve covers for drain and overflow are MC13-0008 and MV01-0021 for the disinfectant return. Not included in kit



This is the MK01-0029 ¾ valve kit



¾ drain valve

cascade overflow valve

is configuration of the drain valves are good for both
es on a DSD-201 and side A-side on a 91E. For the B-
e on a 91E the front valves are opposite of this picture.

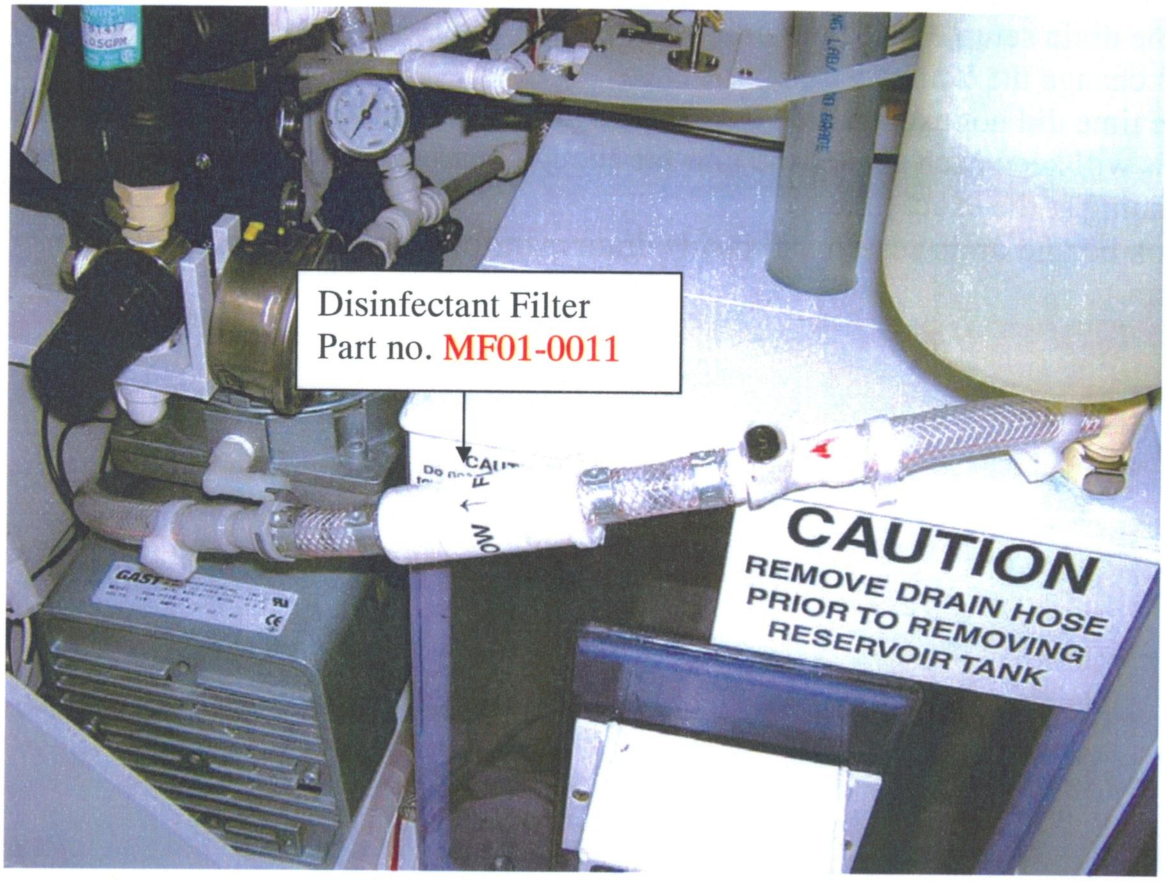
Use these steps for DSD- 91E with old software

a. If unit does not have proper drainage then water will be left in the basin.
b. Press Cancel and then enter to reset unit back to Idle state.

c. Run a cycle as normal and take the time of how long it takes the water to leave the basin during the rinse cycle.
d. If time exceeds 90 seconds observe the water going out the drain tube. If the water looks like it is backed up and waiting to go out the facility main drain, reconfigure the drain setup. The water is just slow coming through the drain. Replace the ¾ inch drain valve MK01-0029. The valve connected to drain tubing inside unit.
e. If the drain setup outside the unit is not visible and the time exceeds 90 seconds just change the ¾ inch valve.
f. The time did not exceed the 90 seconds add air time to the end of your program. This will keep each side of the unit far enough apart to avoid retaining water by draining at the exact time.
g. Look behind drain screen and inside drain manifold. (Gray block attached to basin.)

19. Changing Filters

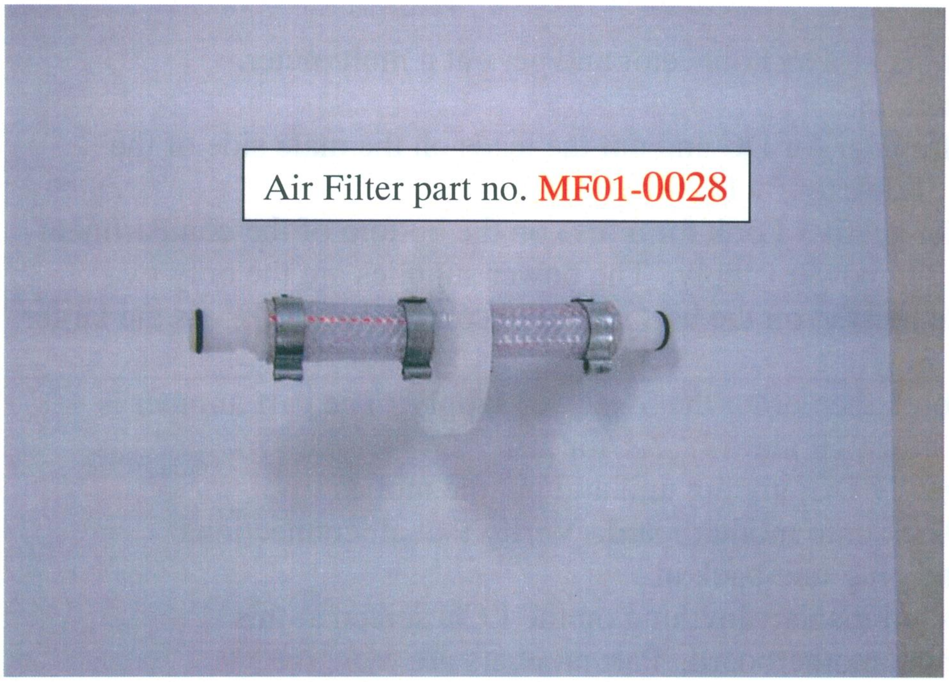
Disinfectant filters – Should be changed everytime the disinfectant is changed or when a no flow failure occurs during disinfectant cycle. If the filter change does not solve the no flow problem keep the filter and troubleshoot for the no flow.



Disinfectant Filter
Part no. MF01-0011

CAUTION
REMOVE DRAIN HOSE
PRIOR TO REMOVING
RESERVOIR TANK

Air filters – Should be changed periodically, at least every three months.



Water filters – Should be changed anytime there is a pressure drop from one gauge on the prefiltration system to the next within the water line. No more than 5psi. Time is not a factor on when these filters need to be changed. The quality of the water is. Poor quality water means you will have to change the filters more frequently. Remember to change the filter in the unit as well. If the incoming pressure is good, but the unit is getting no flow or low chamber during rinse cycle it could be due to a clogged filter within the unit.

20. Unit not powering up

There are several things to look for if the unit will not turn on or give a display. If it does not give a display but the lamps on the front of the control panel are on go to step A. If there is absolutely no power go to step B

STEP A – Unplug the unit and lift up the center console. Open the doors in front of the unit and remove the screw that is going through the front shelf into the center console.

a. Check to see if the bus cable is connected to the back of the control panel. Make sure that all three jumpers are still in place on the back of the control panel.

b. Find the motherboard located in the very front on the buttom of the center electronic compartment (toward you). You will notice a mol ax(three pin connector) connector on the board. One of the pins is not used in the connector.
c. Disconnect the mol ax connector and get out a multimeter.
d. Plug unit back in.
e. Set the multimeter for DC and put the leads on the male side of the connector. Look for 5v DC.
f. If you do not get 5v. Look for a fuse on the bottom of the compartment behind the 28v power supply. The power supplies are the only two components located on the bottom of the compartment. 28v is the larger of the two.
g. If fuse is good, then order the 5v power supply. The part number is MS06-0003 for 91E and ??????? for 201
h. If you do get 5v DC, unplug unit and put the mol ax connector back onto motherboard. Verify that all connections are good and plug unit back in.
i. If unit does not display anything on the LCD screen at this time, order the motherboard. Part numbers are MB01-0003 for DSD-91E(old soft ware), MB01-0021 for DSD- 91E(three rinse software) and MB01-0016 for a DSD-201.

Step B - Check the GFI. Push the red button. If it continues to trip go to GFI tripping question to troubleshoot. If there is still no power use the following steps.

a. Lift up the center console. This can be done by opening the doors on the front of the unit and removing the vertical screw going through the front shelf into the center console.
b. Once console is lifted up locate the main fuse. The fuse is located on the bottom of the compartment with a brown wire running in and out of it. It will be right next to the 28v power supply. The 28v power supply is the larger of the only two components located on the bottom of the compartment.
c. Replace fuse ???????? if bad.

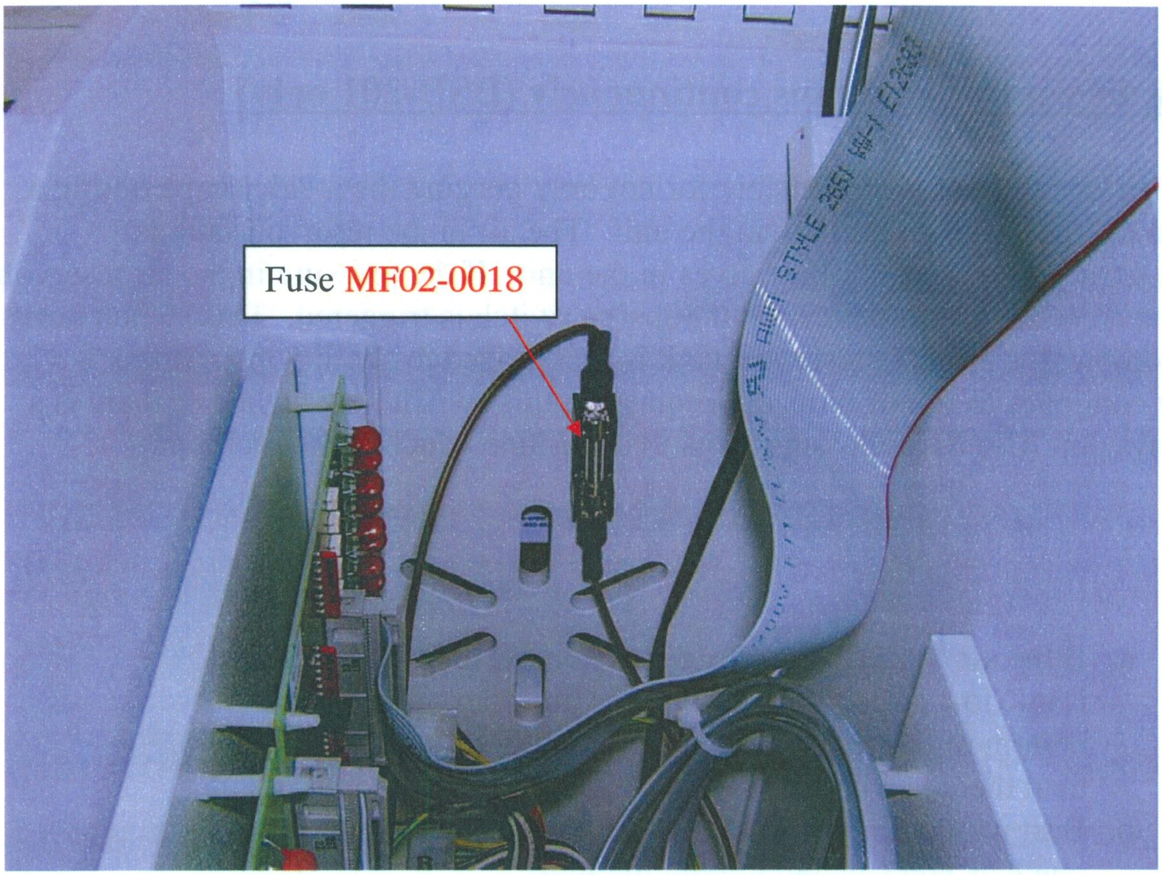
Note: The unit may also need a control panel if the motherboard does not fix the problem.

21. A-side air compressor runs continuously (DSD-201 only)

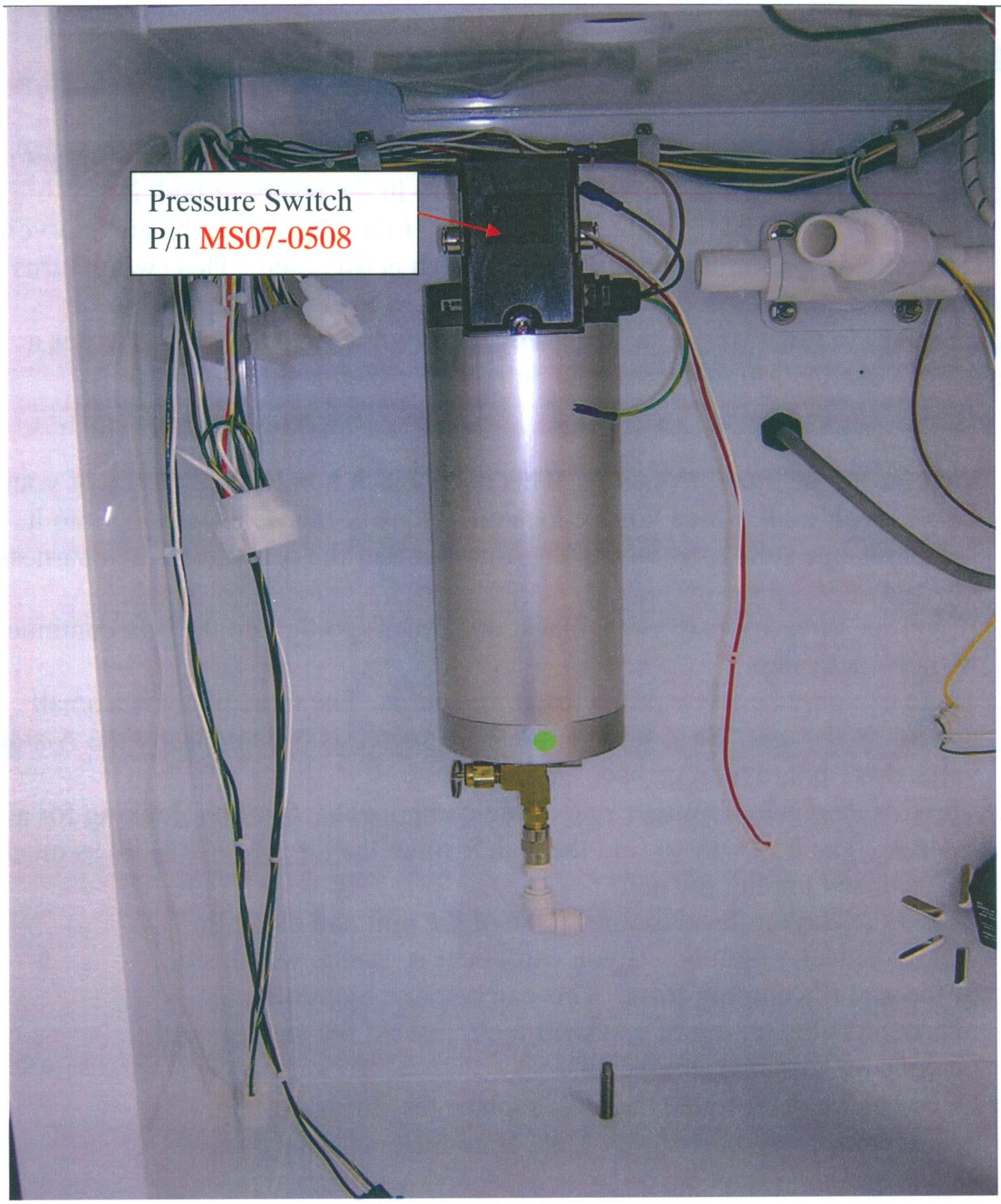
The A-side air compressor is responsible for not only purging the a-side scope during a cycle, but to fill the air reservoir tank in the unit. The air in the reservoir tank is responsible for actuating most of the valves in the unit. If the pressure in the air reservoir tank drops to a certain air pressure (about 30psi) a switch is triggered. This switch turns on the air compressor until the reservoir tank is pressurized to about 50psi. If the compressor continues to run or turns on frequently, this switch may be bad or there is a leak in the system. Use the following steps to determine which is the problem.

a. If the air compressor runs continuously, more than likely it is due to a large air leak. Pull the air relief valve on the bottom of the reservoir tank. If there is very little pressure than there is a leak. Go to step five if there is good pressure.
b. Best way to find the leak is to let the air pressure build as much as you can and unplug the unit.
c. Quickly stick your head inside of the unit and listen for where the leak might be. If you can't hear it, isolate which side of the unit it's coming from. This can be done by putting a make shift plug on top of reservoir tank, just off the tee. Should be done by a trained technician.
d. Once you've determined the leak, replace the tubing, fitting, and/or component causing the leak.
e. Good pressure means there probably isn't a leak in the system and one of the components that supply power to the compressor is bad.
f. To determine the problem from one power source to another you will need to disconnect one of them. Unplug unit and lift center console. This can be done by taking out the screw located underneath the front shelf of unit going up into the console. (open front doors).
g. Once console is lifted up, locate the fuse on the back wall or suspended in the compartment toward the very back. There should be two brown

wires running into it. Remove fuse (MF02-0018). If your unit does not have this order the pressure switch harness kit. p/n 78398-481



h. Plug unit back in. If the compressor turns on replace the A-side valve drive board. p/n MB01-0019
i. If the compressor does not turn on, unplug unit. Replace fuse and order the pressure switch. p/n MS07-0508


Pressure Switch
P/n MS07-0508

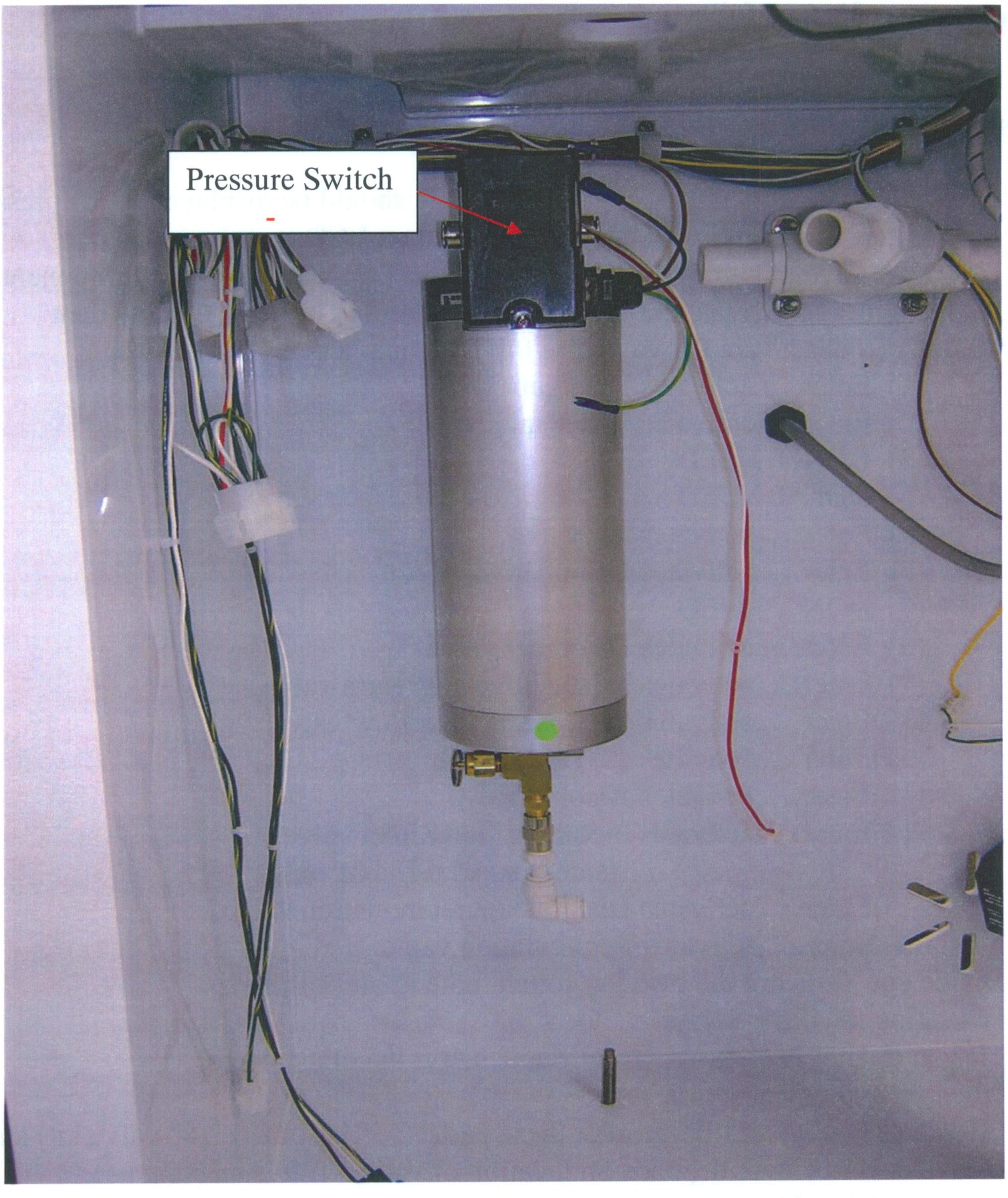
22. A-side air compressor powers on and off frequently

The A-side air compressor is responsible for not only purging the a-side scope during a cycle, but to fill the air reservoir tank in the unit. The air in the reservoir tank is responsible for actuating most of the valves in the unit. If the pressure in the air reservoir tank drops to a certain air pressure (about 30psi) a switch is triggered. This switch turns on the air compressor until the reservoir tank is pressurized to about 50psi. If the compressor continues to run or turns on frequently, this switch may be bad or there is a leak in the system. Use the following steps to determine which is the problem.

a. First locate the pressure switch. This is the black box located on top of your air reservoir tank. Once you've located it, look at the wires running into it. If there is one solid gray wire going into it, order the pressure switch harness kit. p/n 78398-481
b. If you see three wires (brown, black, and green) going into the box continue with the next step.
c. There can only be a few problems at this point. The most likely is a small air leak in the unit. Secondly the pressure switch is bad and lastly the A-side valve drive board may be bad
d. The first step is to eliminate one of the components. Start by looking for an air leak. The best way to find the leak is to let the air pressure build as much as it can and unplug the unit.
e. Quickly stick your head on the inside of the unit and listen for where the leak might be. If you can't hear it, isolate which side of the unit it's coming from. This can be done by putting a make shift plug on top of reservoir tank, just off the tee. Should be done by a trained technician.
e. Once you've determined the leak, replace the fitting, tubing, and/or component causing the leak. If no leak continue with next step.
f. Determine the problem from one power source to another you will need to disconnect one of them. Unplug unit and lift center console. This can be done by taking out the screw located underneath the front shelf of unit going up into the console. (open front doors).
g. Once console is lifted up, locate the fuse on the back wall or suspended in the compartment toward the very back. There should be two brown wires

running into it. Remove fuse. Plug unit back in. If the compressor turns on at any time replace the A-side valve drive board. p/n MB01-0019

h. If the compressor does not turn on, unplug unit. Replace fuse and order the pressure switch. p/n MS07-0508



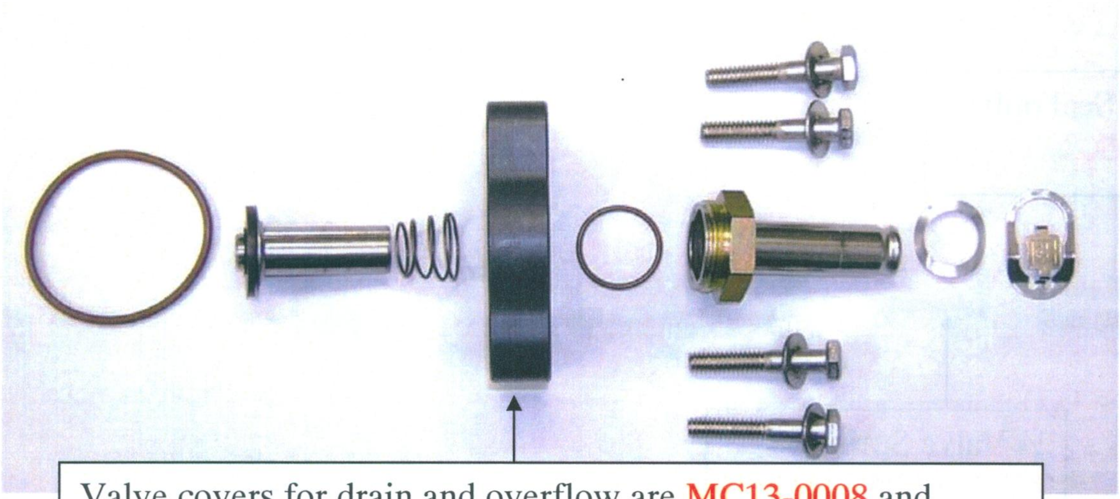
23. Buzzing Noise

Any valve within the unit can make a buzzing noise. The most likely valve to make a buzzing noise in both the DSD-201 and DSD-91E are the ¾ valves attached to the basin. Picture below. You must determine which valve is making the noise. This can be done through diagnostics. Use the following steps.

Use these steps for three rinse DSD- 91E and DSD-201

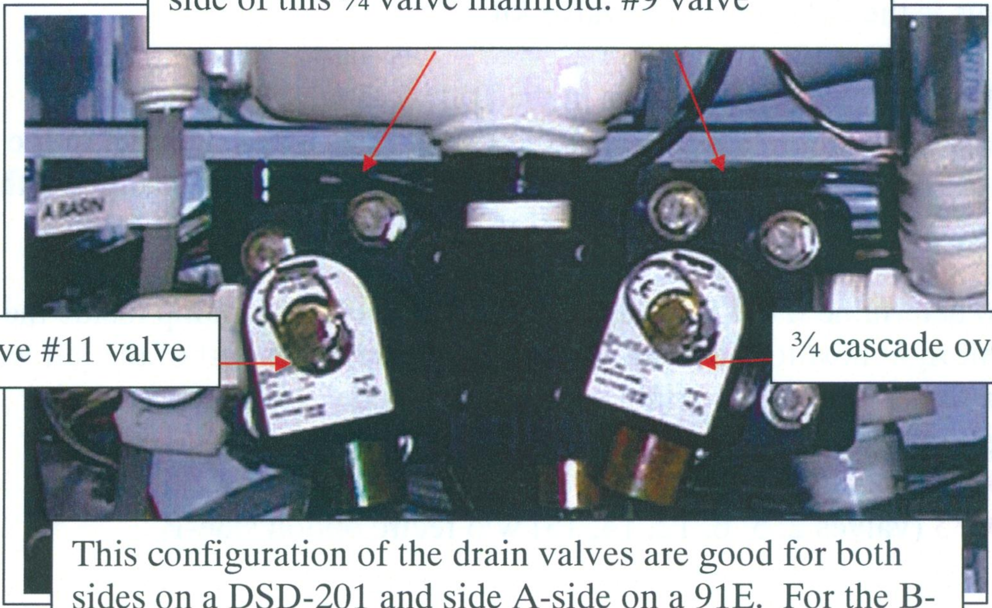
a. Press Setup button and 88 enter. Input code should be displayed. Now press 135 Enter. Diagnostics should be displayed on LCD screen.
b. There are several numbers in diagnostics, one for each valve and component in the unit. To activate the valve press the number of the valve and then Enter. To deactivate the valve use 0#. The numbers are as follows.
    (1) Enter…..activates Detergent valve
    (2) Enter…..activates Water inlet valve
    (3) DON'T NEED
    (4) DON'T NEED
    (5) Enter…..activates Air valve
    (6) Enter…..activates Chamber valve
    (7) DON'T NEED
    (8) Enter…..activates Detergent valve
    (9) Enter…..activates ¾" Disinfectant return valve
    (10)Enter…..activates ¾" Cascade overflow valve
    (11)Enter…..activates ¾" Drain valve
    (12)Enter…..activates Alcohol valve
    (14)Enter…..activates Incoming water inlet valve
    (side B of a DSD-201 only)
    (15)Enter…..activates Disinfectant recirculation valve
    (16)Enter…..activates Recirculation valve
c. Once you've heard the buzzing sound, note it, and continue checking the other valves.
d. If you did not hear the buzzing sound, select the other side of the unit and repeat step 2.
e. If valves 9, 10, or 11 buzz order these parts. MK01-0029 (3/4" valve kit) and valve cover. Cover depends on location of valve. If 9 is buzzing use MV01-0021, if 10 or 11 are buzzing use MC13-0008.

This is the MK01-0029 ¾ valve kit



Valve covers for drain and overflow are MC13-0008 and MV01-0021 for the disinfectant return. Not included in kit

Note: Disinfectant return valve is on the back side of this ¾ valve manifold. #9 valve

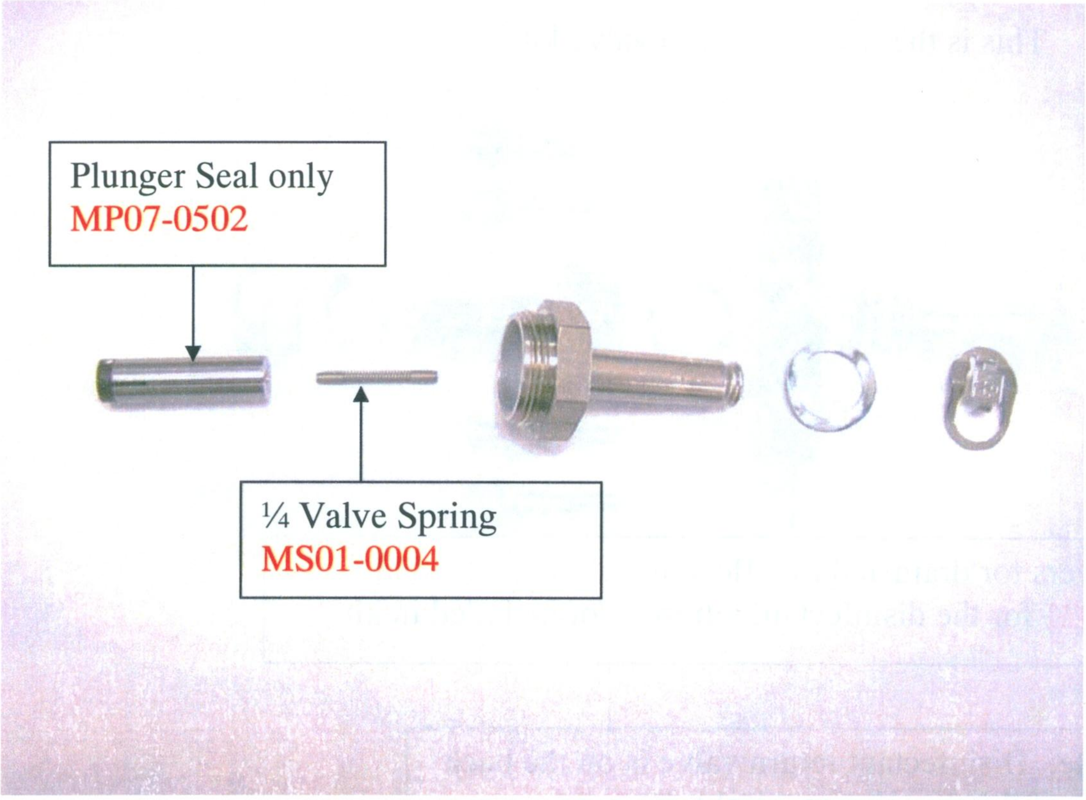


drain valve #11 valve

¾ cascade overflow valve #10

This configuration of the drain valves are good for both sides on a DSD-201 and side A-side on a 91E. For the B-side on a 91E the front valves are opposite of this picture.

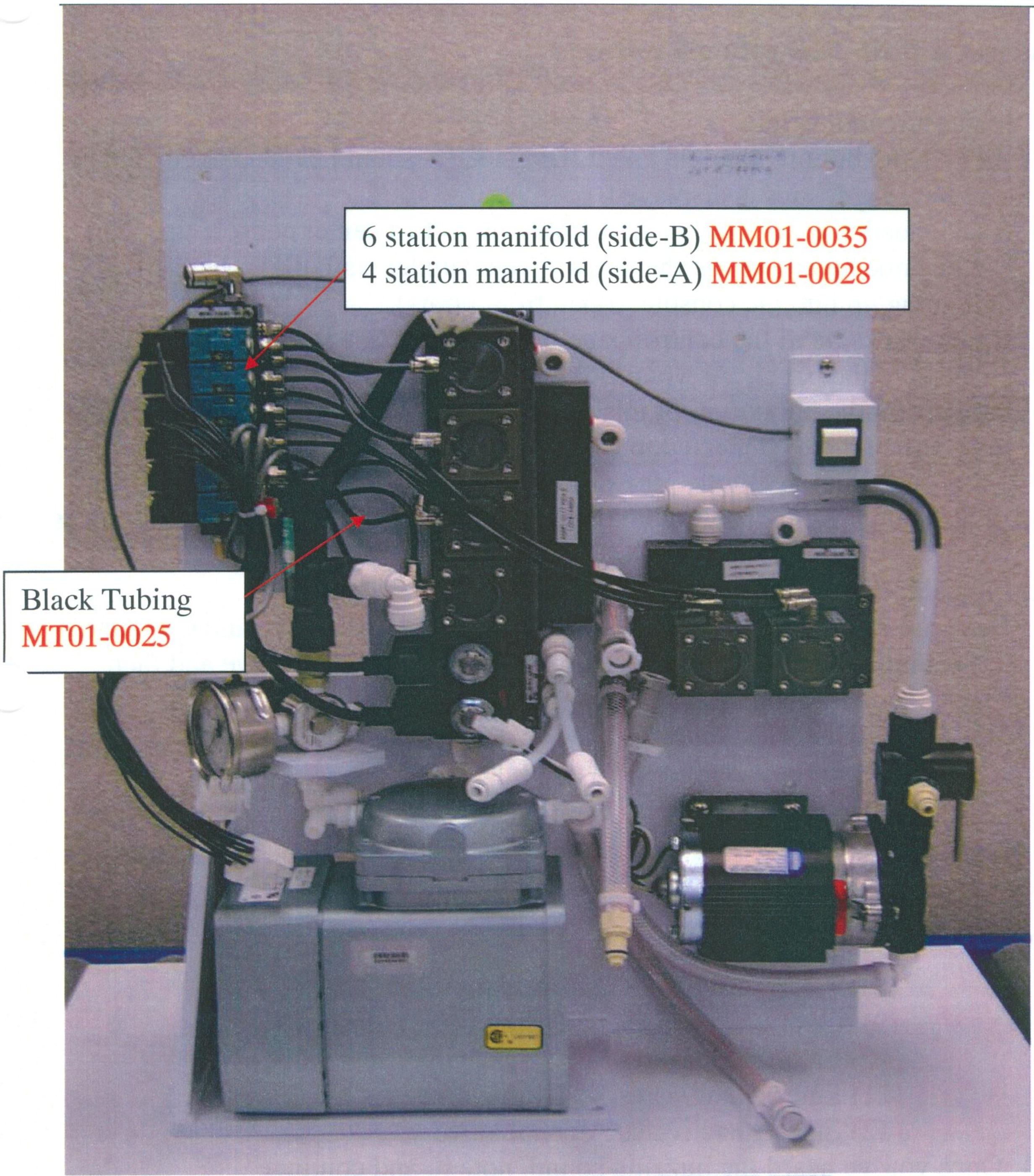
a. If any other valves other than 9, 10, and 11 buzz on a 91E order the MK01-0012 (1/4” valve kit)



This is the MK01-0012 ¼ valve kit

b. There are several manifolds in the DSD-201 which can cause the buzzing sound. Pick the manifold that applies by the number of the buzzing valve, side of the unit and the recirc option in the unit. If the unit does not have the recirc option pick the manifold w/o recirc option.
c. To determine if the unit has recirc option look for a pump inside the unit right next to the basin. Attached to the upper part of the left wall on the A-side and the right wall on the B-side. No pump no recirc option. Part number of the manifold is in red.

MM01-0028 (valves 2, 5, 6, 12) w/o recirc option side-A
MM01-0035 (valves 2, 5, 6, 12, 14, 15) w/o recirc option side-B


6 station manifold (side-B) MM01-0035
4 station manifold (side-A) MM01-0028
Black Tubing
MT01-0025

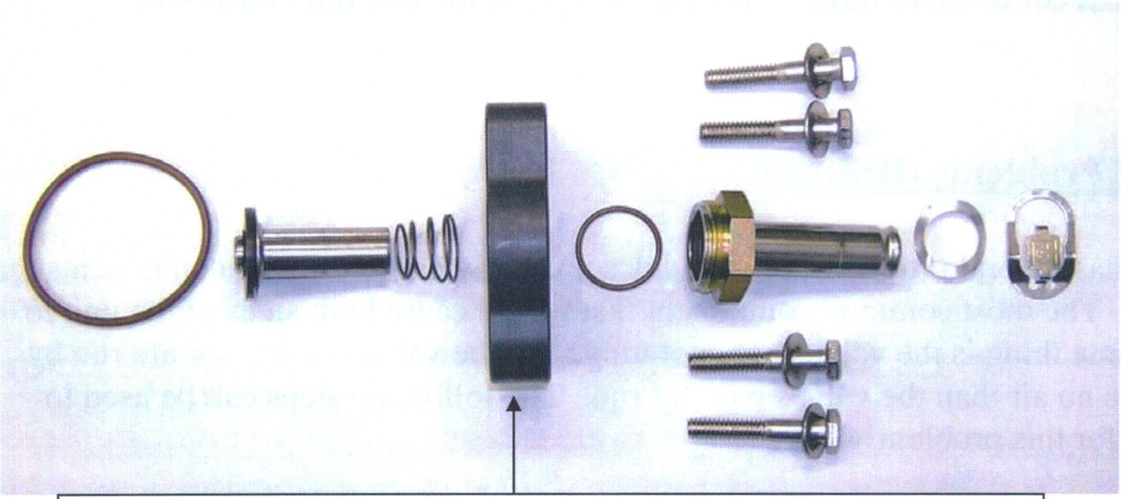
This is a picture of DSD-201 side - B

Use these steps for DSD- 91E with old software

a. Make sure unit is Idle
b. Press Setup button, then 88 enter. Diagnostics should be displayed. Go to step 6 if diagnostics is displayed.
c. If Diagnostics is not displayed. Unplug unit. Lift center console up. This can be done by taking out the screw located underneath the front shelf of unit going up into the console. (open front doors).
d. On the backside of the control panel you will notice a small circuit board attached to the panel. As your looking the board you will see three black jumpers on the left corner of this circuit board. These jumpers extend form the board and are connected to pins. They are about ¼" tall x ¼" wide x 1/8" deep. Put the middle jumper to the left and the top and bottom to the right. Remember don't turn your head upside down. These directions are as your looking at the board.
e. Plug unit back in and use step two again.
f. There are several numbers in diagnostics, one for each valve and component in the unit. To activate the valve press the number of the valve and then Enter. To deactivate the valve use 0#. The numbers are as follows.
    (1) Enter…..activates Detergent valve
    (2) Enter…..activates Water inlet valve
    (3) DON'T NEED
    (4) DON'T NEED
    (5) Enter…..activates Air valve
    (6) Enter…..activates Chamber valve
    (7) DON'T NEED
    (8) Enter…..activates Disinfectant valve
    (9) Enter…..activates ¾" Disinfectant return valve
    (10) Enter…..activates ¾" Cascade overflow valve
    (11) Enter…..activates ¾" Drain valve
    (12) Enter…..activates Alcohol valve
g. Once you've heard the buzzing sound, note it, and continue checking the other valves.
h. If you did not hear the buzzing sound, select the other side of the unit and repeat step 6.

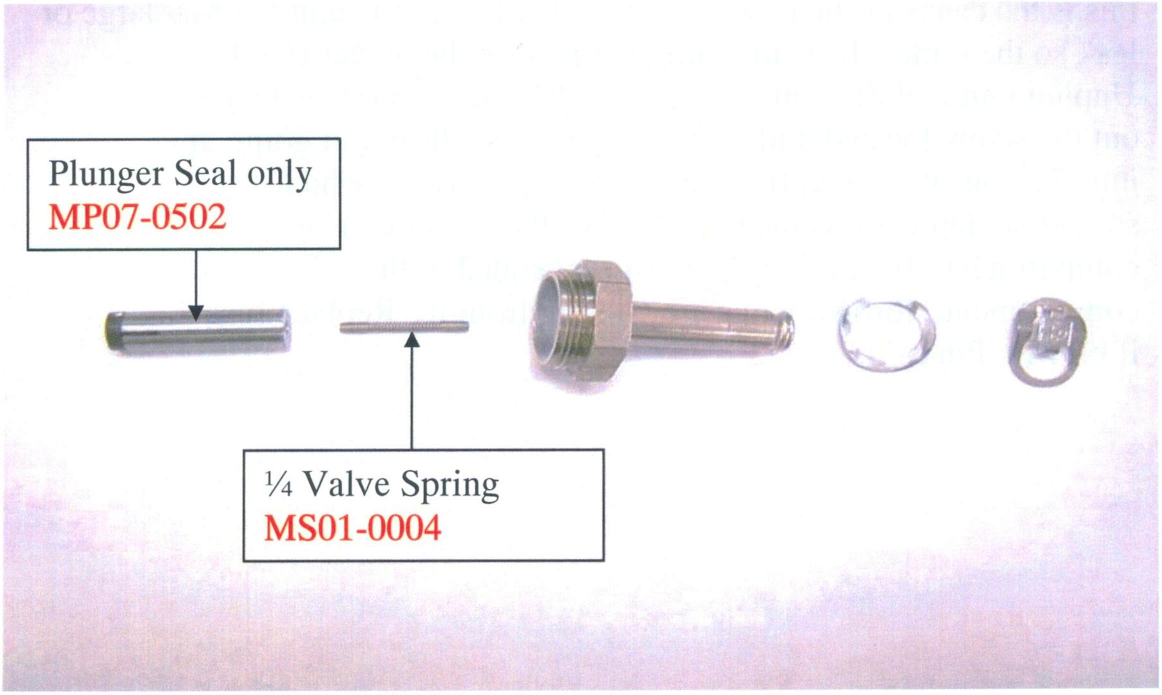
i. If valves 9, 10, or 11 buzz order these parts. MK01-0029 (3/4" valve kit) and valve cover. Cover depends on location of valve. If 9 is buzzing use MV01-0021, if 10 or 11 are buzzing use MC13-0008.

This is the MK01-0029 ¾ valve kit



Valve covers for drain and overflow are MC13-0008 and MV01-0021 for the disinfectant return. Not included in kit

j. If any other valves other than 9, 10, and 11 buzz on a 91E order the MK01-0012 (1/4" valve kit)



Plunger Seal only
MP07-0502

¼ Valve Spring
MS01-0004

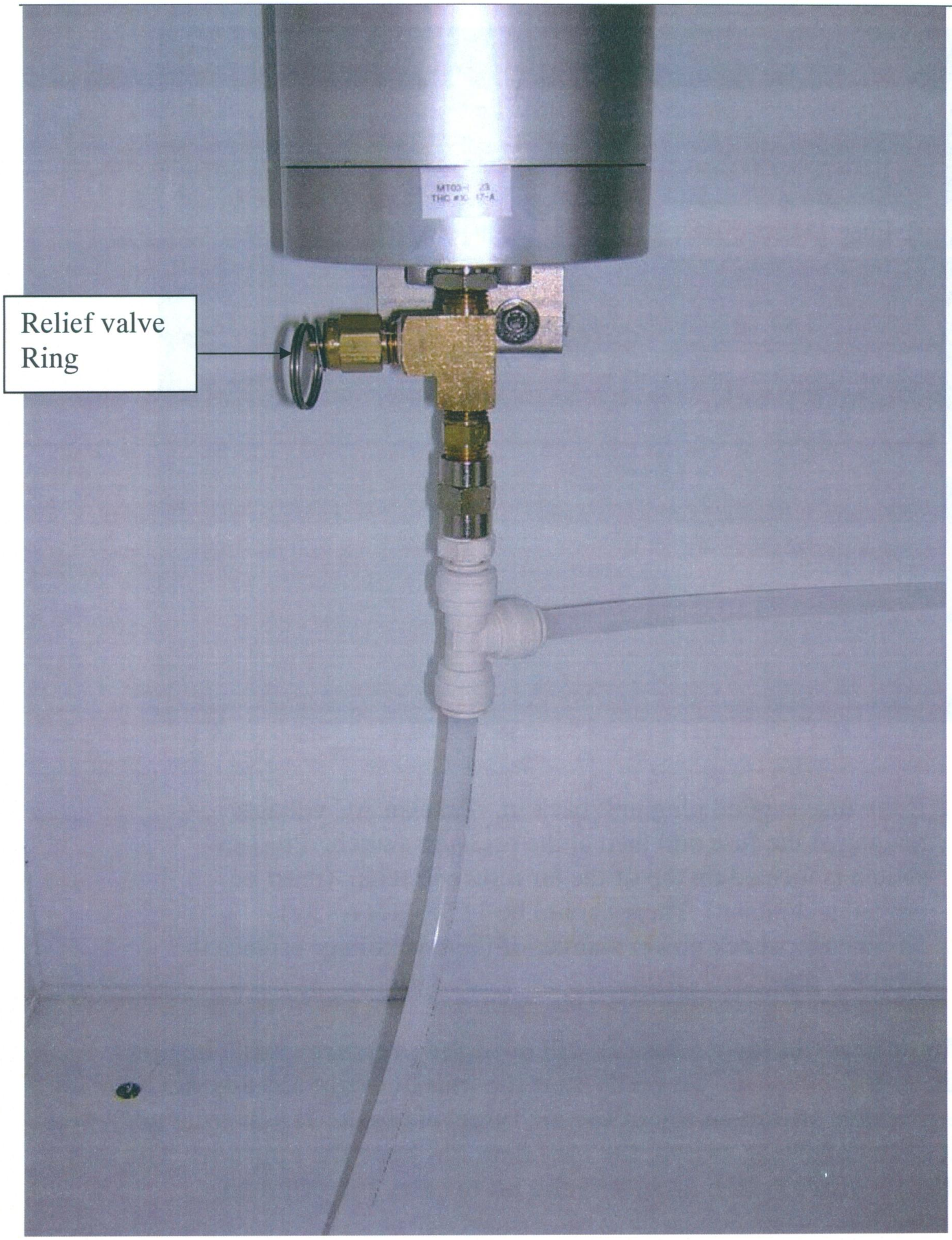
This is the MK01-0012 ¼ valve kit

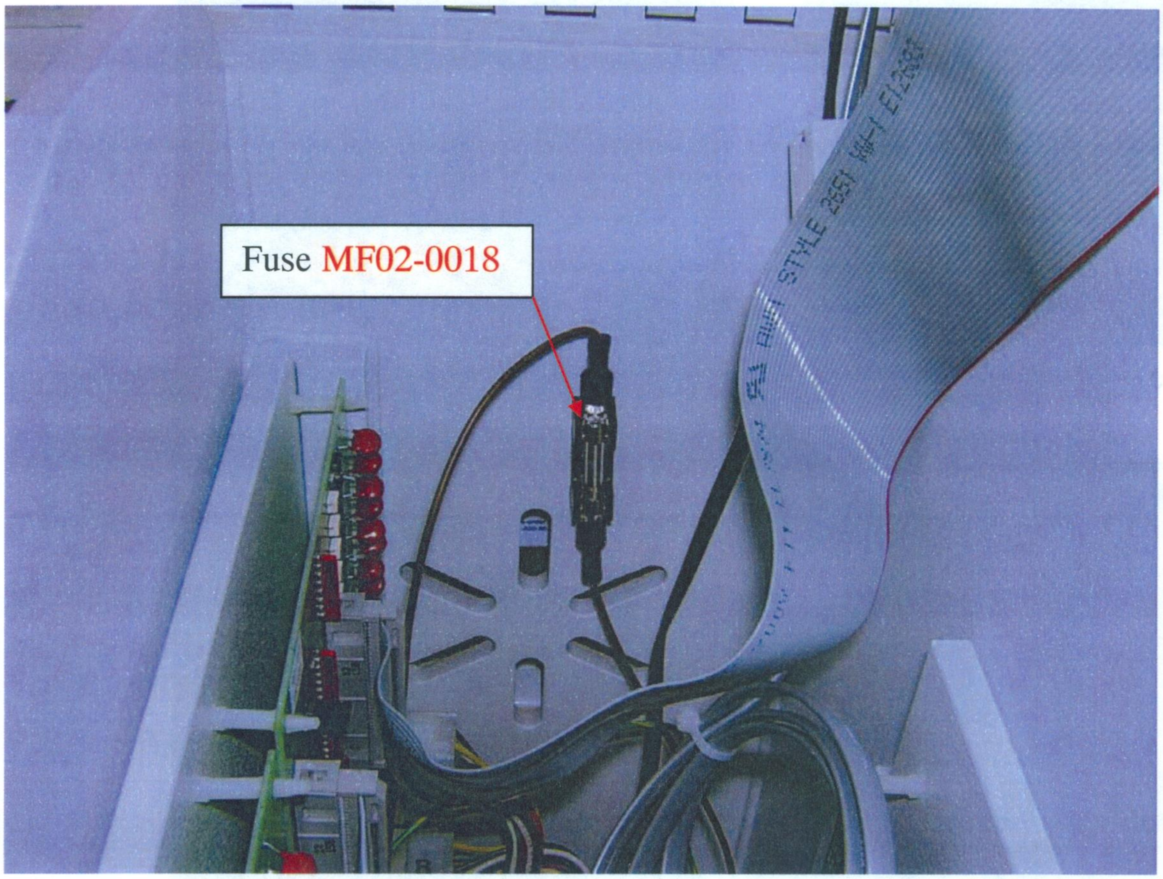
Note: If valves continue to buzz order the coil. Call for coil part numbers.

24. Several Problems (DSD-201)

When a unit has several problems on both sides it usually has to do with components that are common. The most common component that would cause both sides of the unit to fail for the same thing is the valves not operating. All the valves in the unit are run by air. If there is no air than the valves will not run. The following steps can be used to troubleshoot for this problem

a. Make sure unit is on.
b. Locate the pressure relief valve on the air reservoir tank. Picture below. The tank is located behind the A-side disinfectant reservoir tank on the back wall. The relief valve is on bottom of the tank.
c. Pull the ring and see if there is any air pressure. If there is no air pressure this is the cause of the problem. Its unlikely that the unit has that large or leak so there must be something wrong with the power supply.
d. Unplug unit and lift center console. This can be done by taking out the screw located underneath the front shelf of unit going up into the console. (open front doors). Locate a fuse which should be mounted on the back wall of the center console compartment. It could also be just suspended in the compartment. (brown wires are coming from it) Replace fuse if blown. P/n MF02-0018


Relief valve
Ring



e. If the fuse is good plug unit back in. Take an AC voltage reading at the fuse and then at the pressure switch. Pressure switch is located on top of the air reservoir tank. (must be trained technician) There should be 115v AC (+/- 3v)
f. No voltage, check power source. If there is voltage replace the switch. p/n MS07-0508.

NOTE: If unit does not have a fuse, it will need the pressure switch harness upgrade kit. p/n 78398-481. To verify that the unit does not already have the kit look at the pressure switch on top of the air reservoir tank. If you see a gray wire coming out of the pressure switch, the unit does not have the upgrade. The unit may need the pressure switch as well as the kit to solve the problem.

25. Disinfectant foaming

Foaming can be caused by a few things, but sometimes may go on resolved with a specific load of disinfectant. If the clear tubing that goes into the disinfectant reservoir tank is too long or too short it can create foaming. Before you change out the tubing I would recommend you wait until you put in new disinfectant. The current load of disinfectant may be the reason for the foaming.

If you use detergent make sure to rinse the scope thoroughly. The program you use may also be injecting to much detergent. Be sure that the detergent is properly mixed and the inject time is adequate.

The foaming continues and you're not using any detergent, try running a couple of cycles with water in the reservoir tank. This will clear the lines of any residual disinfectant or detergent that may be causing the foaming. All you have to do is load water instead of disinfectant to flush the unit. Use your normal program.

26. Troubleshooting Air leaks on the DSD-201

This section is a guide to identify the source and correction of air leaks in the DSD-201.

Section Contents:

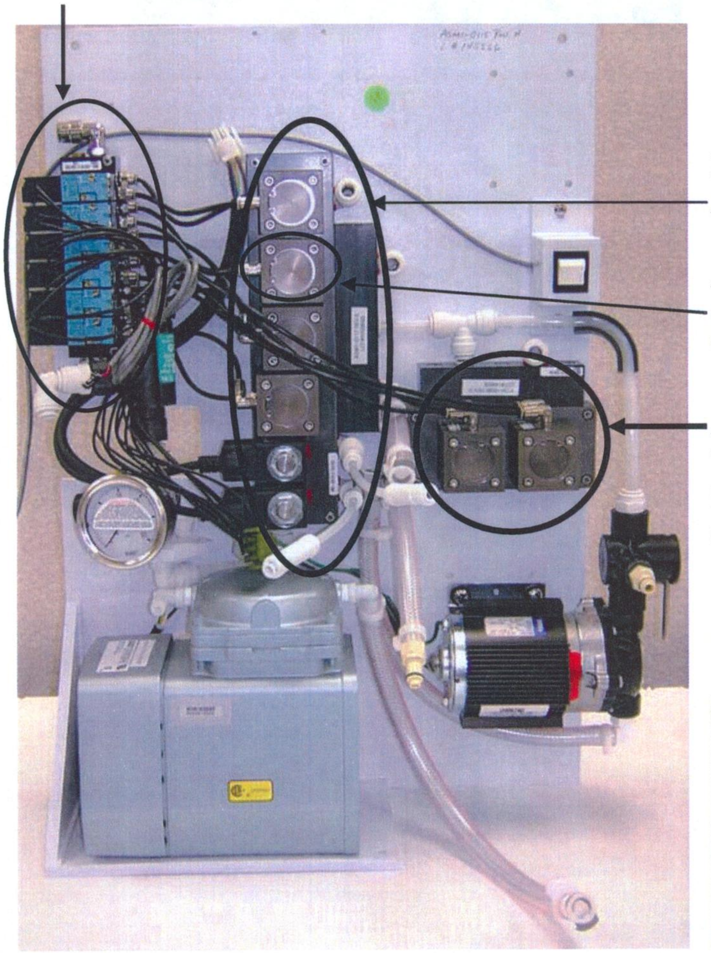
1. Tools/materials needed
2. Description of components/parts
3. Theory of operation
4. Troubleshooting

1. Tools/materials needed:

- John Guest locking tool P/N 47049-157,
- A length of small (5/32) pneumatic tubing (MT01-0025 black, 47509-390 orange)
- A length of MT01-0024, 3/8 pneumatic tubing, approximately 18".
- A 3/8" tubing plug. (use 2 – 3" of MT01-0024 and seal one end)
- Small cup of water.
- Cloth (in case of a spill).

2. Description of parts

Air valve solenoid assembly
MM01-0035 Side B (shown). These two assemblies are commonly called the "MAC" valves.
MM01-0028 Side A

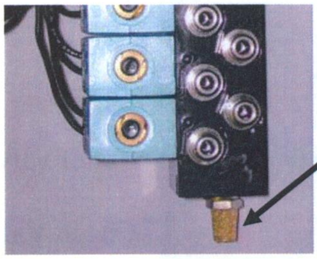


Main Manifold:
ASM1-0117, this is the inlet manifold.

Air valve blocks
41600-123 or 41600-124, also referred to as the "Fabco" air valve blocks.

ASM1-0086 Water inlet manifold (side B only). This has the main water in valve and the Auto line disinfectant valve. These valve blocks are the same as the Main Manifold.

Fig 1



Air Vent: Located at the bottom of each Mac Valve.

Fig 1a

Air Tank MT03-0023

Fig 2

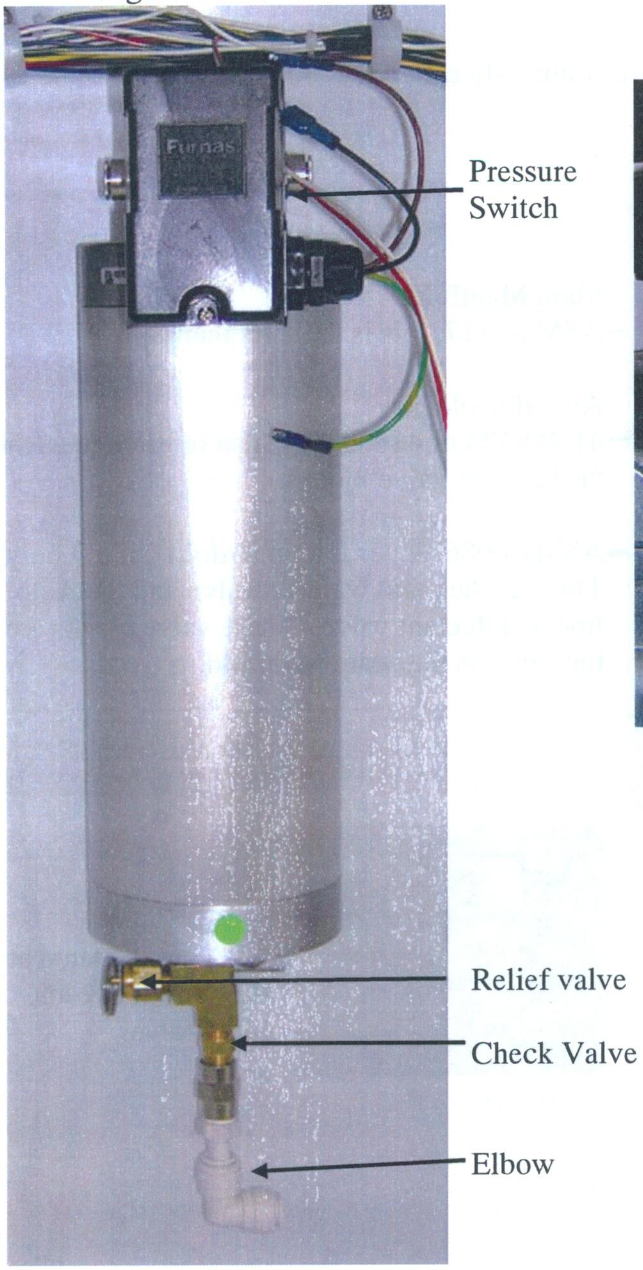
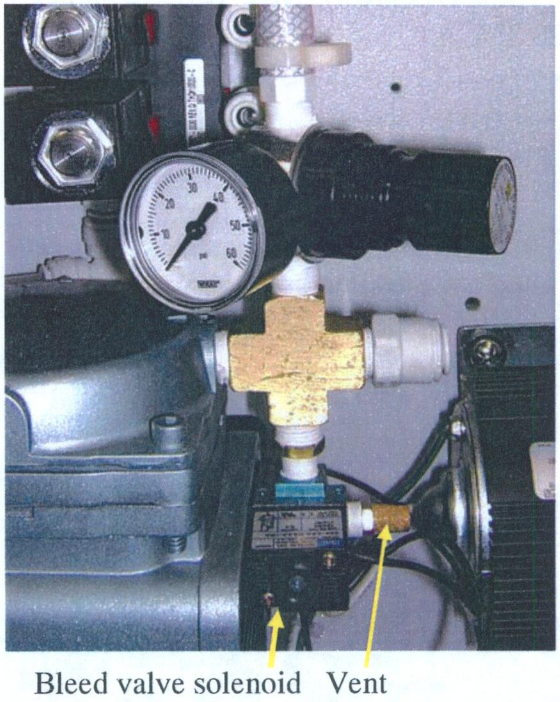

Furnas
Pressure Switch
Relief valve
Check Valve
Elbow

Fig. 3. A side compressor with regulator


Bleed valve solenoid
Vent

3. Theory of operation

The Main inlet valves on the DSD-201 are pneumatically controlled (with the exception of the Alcohol & detergent). Each valve block is controlled by a specific solenoid. The solenoids are controlled by the Valve drive board which is driven by commands from the CPU (motherboard).

Air is supplied to each "Mac Valve" from the Air tank. The A side air compressor is tasked to keep the air tank pressurized. When the internal pressure reaches 35 PSI, the pressure switch activates and turns on the A side compressor. The compressor shuts off when the air tank reaches 50 PSI.

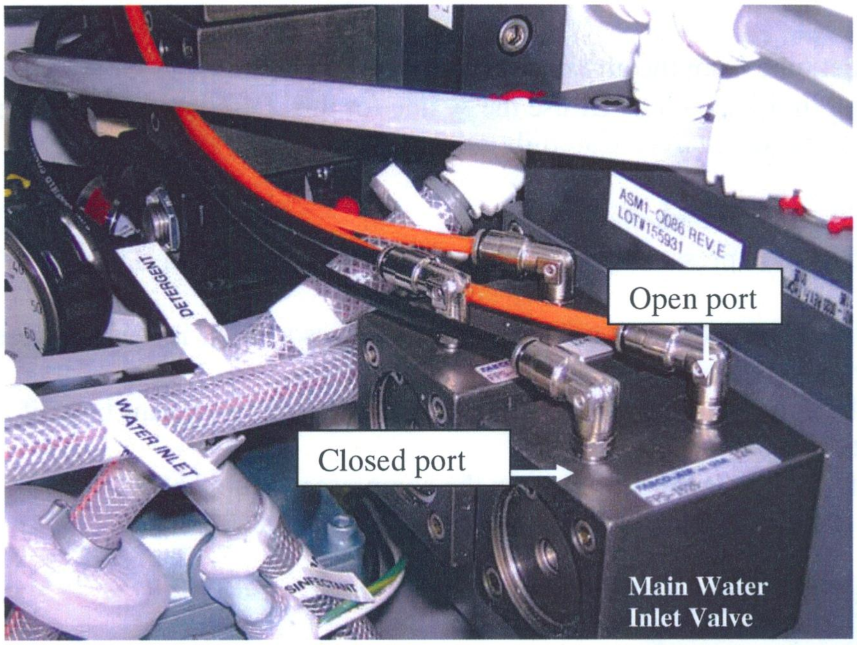


Fig 4

Fig 4, shows the most current revision of the DSD-201 pneumatic tubing. **NOTE**: Earlier revisions will have black tubing on both the Open and Closed ports of the valve blocks.

When a valve is opened, air pressure will be applied to the orange tubing (the Open port). Air is then vented thru the black tubing to the Mac valve and out the vent.

To close the valve, air pressure is applied to the Black tube (Closed port). Air is then vented thru the Orange tubing to the Mac valve and out the vent.

NOTE: Air is only vented when a change of state occurs in the Air valve block (*it's a short burst of air – not continuous flow)*.

NOTE: When the DSD-201 is idle, all valves will be CLOSED with the exception of the Main Water Inlet valve. See Fig 4. In an idle state, this valve will have air pressure on the Orange tubing. All others will have air pressure on the black tubing.

4. Troubleshooting

The first step will be to determine which station is leaking: The A side, B side or Air Tank.

4.1. Quick Check: Physically feel the vents at the bottom of the Mac valves to see if you can feel air leaking from the vents. Check all three – the A & B sides and the A side air compressor. This may help determine which station is causing the leak.

4.2. Determine if side A or B is leaking.

Determine which station is leaking by connecting the two outlets together. **See Fig 6.**

- Unplug the DSD.
- Pull the relief valve.
- Disconnect the B side outlet tube from the air tank. (Fig 6)
- Loop a piece of 3/8" tubing into the outlets. Or use the A side for this. Disconnect the A side 3/8" tubing from the top of the Mac valve. Carefully bring it to the B side outlet connector and plug it in.
- Plug the DSD back in and let the air tank charge up.
- If the air tank charges and the compressor doesn't cycle on & off, the leak is on station A or B. ***Go to step 4.3***
- Check for an air leak at the Bleed valve vent on the A side compressor. If air is venting there, it could be the check valve on the air tank.
- Disconnect the air line tube going into the elbow connector at the bottom of the air tank (if the tank is empty disregard this step) .
- If no air is leaking from the elbow, the bleed valve on the compressor could be bad. (this would cause the tank not to fully charge up, or not charge all the way to 50 PSI)

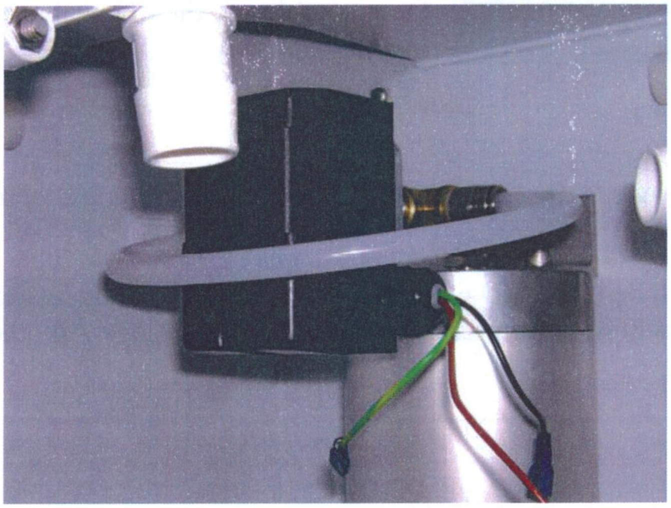


Fig 6

4.3. Air valve block troubleshooting.

- The following setup used a known leaking valve placed loosely in the DSD for this document.
- Fig 7a & 8 show the valve with the tubing set up to test for air leaks.
- Fig 7b shows which port is open and closed.
- The Orange tube is connected to the "Open side".
- The Black tube is connected to the "Closed" side and then is placed in a cup of water (Fig 8)

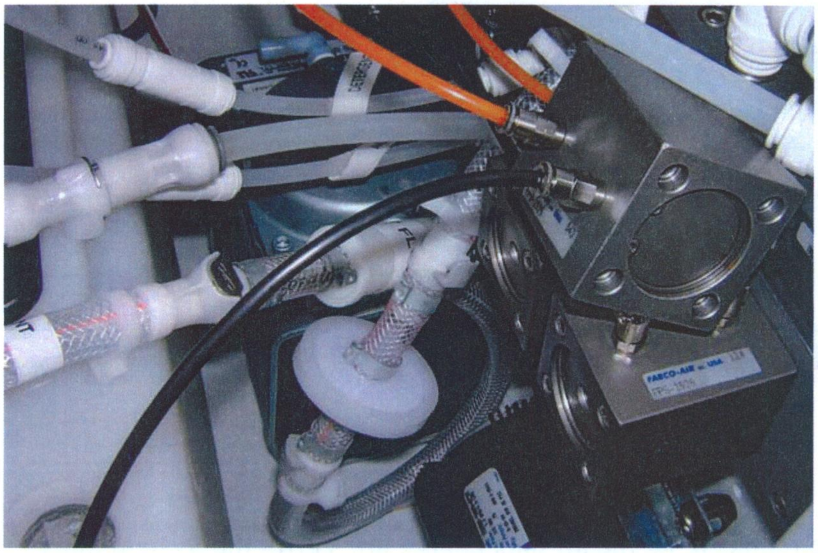


Fig 7a

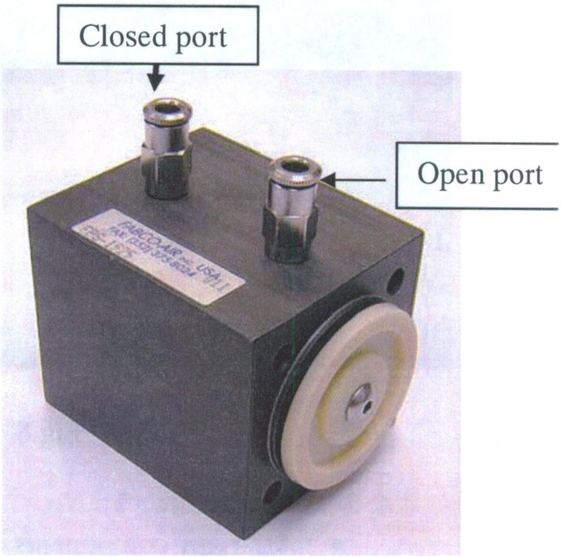
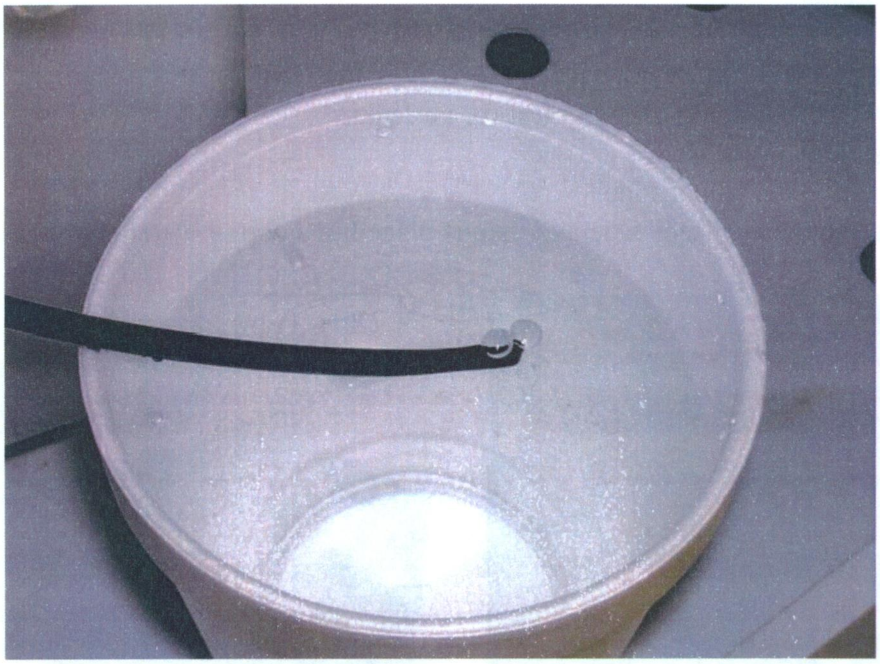


Fig 7b

This method will test the valve in the closed state, except for the main water inlet valve.

Read the section below before starting this procedure.

- Valve 14 is shown in Fig 7a. This valve is normally "open" on software 3.xx and later. On software ver 2.xx the default setting on power up is "closed". Fig 7a shows the closed port tubing is placed in the water.
- Remove the orange or black tube from the open port.
- Connect a length of tubing (black or orange) into the open port and then place the othe end into the cup of water (unless you can feel air coming out of the tubing.
- Watch the open end of the tube in the water. Some leaks are slow and you should wait a few minutes to verify there are no air bubbles escaping thru the tube.
- Fig 8 shows an air bubble.
- Test the next valve until all are tested.
  - Replace any leaking valve blocks (*remember to turn off the power and vent the air tank*).
- If all the valves test OK, the leak is probably in either the Mac valve or one of the air lines to it.



NOTE: Make sure the cup of water is secured to prevent spills

Fig 8

4.4. Test the system.

- After any components are replaced, let the air tank charge up. Verify the System idles without the A side compressor turning on.
- Run three complete cycles on both stations.
- Let the DSD sit idle to verify the A side compressor does not cycle on & off which would indicate there is still a leak.